GENETIC PSYCHOLOGY MONOGRAPHS

Child Behavior, Animal Behavior, and Comparative Psychology

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COMPARISON OF CHILDREN'S PERSONALITY TRAITS, ATTITUDES, AND INTELLIGENCE WITH PARENTAL OCCUPATION . . . 3

By Nancy Ruth Maddy

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COMPARISON OF CHILDREN'S PERSONALITY TRAITS, ATTITUDES, AND INTELLIGENCE WITH PARENTAL OCCUPATION*

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I. INTRODUCTION

Intelligence as found in various occupational levels has been a subject of considerable research. As early as 1917 it was noted that the intelligence of children tended to increase with each higher occupational level of their fathers (4). The problem, however, of measuring personality traits or attitudes of varying occupational groups is a neglected field of investigation.

The purpose of the present study is to compare such traits and attitudes as well as intelligence of the children of two widely divergent occupational groups, and to determine if differences are present when the economic status of the family increases or decreases beyond the average of their occupational group. This problem of determining differences in nonintellectual traits would seem to be of importance in relation to further psychological and sociological studies of occupational group differences.

II. HISTORICAL SURVEY

The studies relating to the present problem are reviewed in three main groups. In the first are some of the more important experiments on the relation of intelligence of children to the occupation of the parents. The second group includes some previous work done by experimenters with the tests used in the present study. The third, although not exhaustive, covers studies showing the effect of sibling rank upon aggressiveness.

A. EXPERIMENTAL STUDIES OF RELATION BETWEEN INTELLIGENCE OF CHILDREN AND OCCUPATION OF PARENTS

Among the earliest and most comprehensive studies of the relation between intelligence and occupation are those made on 18,000 *men in the United States Army. These studies indicate a significant* increase in intelligence-test scores as a function of occupational status. Although this central tendency was pronounced, there was a considerable degree overlapping and, in most occupations, men of all levels of intelligence were found. Pintner (36, p. 531) found that the 75 percentile shipping clerk ranked about the same as the 25 percentile physician in intelligence test scores. He is of the opinion that "since children tend to inherit the same kind of intelligence as their parents, we ought to find differences in the intelligence of children as we proceed from the lower to the higher occupations of their father."

Since the compilation of the Army data, many other experiments have indicated that the children of various occupational groups "show in general a central tendency in intelligence level in accordance with socio-economic level, and the same tendency to wide variation at each level . . . they tend to score, on the average, at the level of their fathers. But since in general there is also a considerable correlation in intelligence between husbands and wives, we may speak broadly of family level of intelligence in relation to socio-economic status" (34, p. 7). M. Outhit (35) found that when *the average IQ of all children within a family was correlated with* the average *IQ* of the two parents the *r* was +.80±.03. The correlation between intelligence of fathers and mothers was +.741±.042.

Differences in intelligence of children from varying socio-economic groups are found at the pre-school level and continue through all grades including high school and college. In the high school and college group the increased mean (or median) intelligence quotients on all occupational levels is indicative of the selective factor operating in these groups, but here, as in the lower grades, the tendency is for the higher intelligence to be found among the higher occupational groups, and for the intelligence ratings to increase within the group as the school grade increases.

In 1927, Gesell and Lord (19) made a comparative study of 11 pairs of children ranging in age from 31 to 52 months. Each pair comprised one child from a nursery school in a wealthy area, where the families were of the professional socio-economic group, and one child from a poor economic area, where the mothers were employed during the day. A comparison was made of these children's responses to the test situations of the Yale developmental schedules. The nursery schools had the same material equipment and gave the children equal advantages. These investigators found in the children from professional families a definite tendency toward superior "mental equipment" where intellectual ability, language ability, emotional vitality, and drive were considered. In the field of self-care, such as washing, tying, combing, etc., the children from the poorer economic area showed the advantage. This latter group also showed considerable more gravity, restraint, and inhibition during the tests, although noisy during play periods. Their reactions to test situations were interpreted as evincing a lower degree of spontaneity and expressiveness.

In the study of Goodenough (21), on 380 children varying from 18 to 54 months of age, it was found that with each lower occupational level of the parents, there was considerable decrease in the average IQ of the children. She further reported that very young children of different socio-economic classes show a great difference in response to such simple requests as "to throw a ball" and that these differences are well established by the ages of 2 to 4 years.

Collins, in his study among children from Grades 1 to 6, found that in all but the agricultural occupations the intelligence test scores tended to decrease with lower occupational levels from a mean of 114.5 among the professional group to 94.3 among the unskilled. He concluded that "the occupation of the father . . .

may be considered as a rough index of the intelligence of the child. The chances are that half of the children of professional parents will be of superior intelligence and that not more than one-tenth of the children of unskilled laborers will show a similar degree of intelligence" (9, p. 169).

Results similar to the Collins study were obtained by Pressey and Ralston (43) in their experiment on 548 unselected children aged 10 to 14 years. In this experiment, 85 per cent of the children of professional men made scores above the median for the total group, while 68 per cent of the children of business men, 41 per cent of the children of skilled workers, and 39 per cent of the children of laborers scored above the median.

Another investigator, Dexter (11), found an average intelligence quotient of 115 among children of professional men and an average of 92 among children of the semiskilled. In this experiment considerable variation was found in the intelligence quotients within the different professions. Thus, the children of lawyers had an average *IQ* of 119, of professors 116, of clergymen 113, of doctors 112, and of civil engineers 111.

In the data from the army intelligence tests, Fryer (17) also found a wide range in scores for men of the various professions. In his study, civil and mechanical engineers ranked highest, with an average score of 161, clergymen had an average score of 152, and physicians 127.

One of the best known pieces of research in this field is that of Haggerty and Nash (24) in 1924. Their data were taken from a survey of rural schools in New York and included 8,121 children from grades 3 to 12. They found a median *IQ* of 95.8 for all children tested in the elementary grades and 110.5 for the high school group. In the elementary and high schools the children of professional fathers had a median *IQ* of 116 and 121, respectively, while the children of unskilled workers had a median *IQ* of 89 and 111. It was found that among the 12 occupations ranking highest in the grade schools, there was an increase in the median *IQ* of 1.3 when compared with the *IQ* of children in high school whose fathers were engaged in the same occupation; but among the eight lowest occupations in the grade school there was an increase of 14.5 in the median *IQ* of the same occupational group when found in the high school. This shows that the selective factor, which *operates slightly in the highest occupational groups, operates to a* very great degree in the lowest occupational groups.

In both the elementary and the high schools, the children of professional fathers had a median *IQ* 9 points higher than that of the business group, which ranked next highest; and 27 points above that of the unskilled in the grades and 15 above the unskilled in the high school. The rank order of median *IQ*'s for elementary and high schools was the same except for unskilled, which went from fifth place in the grade school ranks to third in the high school. Selection operated most in the unskilled group, which comprised only 7 per cent of the high school groups in terms of grade school groups.

The results of these experiments, and of others, indicate differences in children from various socio-economic levels which are similar to the findings for men on the army tests.

Similar results have been found in other countries. In 1911, Morle (33) compared results of tests given children in a poor area of Paris with those given in a wealthy area. Among the 60 children thus studied, he found that those in the poor area were one-fourth year behind the level for their age and those in the better *area were from one to one and a half years advanced.*

In the county of Northumberland, England, Duff and Thompson (12) studied children 11 and 12 years of age and found the average *IQ* of children of professional men to be 112. In the Isle of Wight, McDonald, using a similar age group, found that the children of professional men had an average *IQ* of 107. In both experiments there was a steady decrease in *IQ* with decreasing occupational levels.

The same tendency was found in a survey in British Columbia by Sandiford (44) among 5,296 students from the high schools, normal schools, and university. The highest median *IQ*, 105.1, was that of children of professional men with a decrease in median intelligence quotient for each lower occupational group.

The findings of these various studies are presented in Table 1. Some authors gave their results in terms of the mean and some the median *IQ*. These differences, which are noted in the table, do not affect the horizontal comparison of figures.

TABLE 1

INTELLIGENCE OF CHILDREN BY PARENTAL OCCUPATION*

(*IQ*'s in terms of mean *unless otherwise noted*)

	Experiment	*N*	Profes-sional	Proprietors, managers, and officials	Clerical	Skilled workers	Semiskilled workers	Unskilled workers
Nursery school	Goodenough, F. L. (From 2d testing)	380	125.0	119.7 (semiprofessional)	113.4		108.0	95.8
Elementary grades	Dexter, E. S. Grades 1-3	2,782	115.0	104.0 (business)	104.0	99.0	92.0	89.0
	Collins, J. E. Grades 1-6		114.5	113.0	112.0	102.0 (combined skilled and semiskilled		94.0
	Haggerty and Nash Grades 2-8 (Median *IQ*)	3,590	116.0		107.0 (business & clerical)	98.0	95.0	89.0
	Duff and Thompson (England)	15,220	112.2	110.0				96.0
	Macdonald (Isle of Wight)	2,047	107.0	109.0			96.5	96.0
High school	Haggerty and Nash (*Median IQ*)	1,044	121.0		112.0 (business & clerical)	108.0	108.0	111.0
High school and university	Sandiford, Peter (British Columbia —Median *IQ*)	5,296	105.1		103.4	102.5	101.7	100.8

*Farm group not included in table as most experimenters did not differentiate between farm owners and tenants on one hand, and farm laborers on the other. Edwards lists the former as proprietors in Group II, and the latter as unskilled workers in Group VI.

B. Background and Reliability of Tests Used

1. *Pintner Aspects of Personality Inventory*

Two different types of tests were chosen for the study of personality differences in the socio-economic groups. *The Aspects of Personality Inventory* by Pintner *et al.*, a recently standardized test which we believe to be as yet unused for experiments except by its authors, is devised to measure three distinct personality traits. The other test chosen for this experiment was the Pressey *X-O Test for Investigating the Emotions*. This is one of the oldest and most widely used tests for nonintellectual traits and is an attempt to measure attitudes and peculiarities of judgment rather than definite personality characteristics.

The *Aspects of Personality Inventory* by Pintner, Loftus, Forlando, and Alster was published in 1938. It is an eight-page questionnaire in the form of the true-false test, using the response "same-different." The booklet is divided into three sections with 35 scored items in each section.[1] Section I, the *A-S* test, attempts to measure ascendant-submissive behavior; Section II, the *E-I* test, attempts to measure extrovert-introvert behavior; and Section III, the *E* test, is an attempt to measure emotional stability.

The highest possible score for each of the three sections of the test is 35. A high score is considered indicative of ascendance in Section I, extroversion in Section II, and good emotional adjustment in Section III.

In standardizing the test the authors found the intercorrelations of the three sections, based upon results obtained from 150 pupils in the fifth and sixth grades, to be as follows:

$$r\ A\text{-}S.\ E\text{-}I = .26 \pm .050$$
$$r\ A\text{-}S.\ E = -.22 \pm .052$$
$$r\ E\text{-}I.\ E = .29 \pm .050$$

This indicates a tendency for ascendance to correlate slightly but positively with extroversion, and extroversion with emotional stability, while emotional stability seems to correlate with submissiveness rather than with dominance. The correlations of mental and chronological age with the three sections of the test indicated that these two factors had very little effect upon the scores.

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[1] Section III has 44 items, 9 of which are not scored but are scattered throughout the test to break up its emotional nature.

2. *Pressey X-O Test*

In the opinion of Murphy (34), the Pressey *X-O Test* is one of the most satisfactory for personality measurement. It is an attempt to measure emotionality by determining attitudes towards morals and manners as shown by things considered wrong, adjustment difficulties as expressed in worries, and interests. The value of the attitudes tests depends upon the "assumption that personality traits are mirrored in opinions and attitudes . . . The attitudes technique, therefore, presents the subject with a number of ideas and calls for a reaction" (18, p. 5). On such tests it is difficult for the subject to strive for a good score as the significance of the response is largely concealed.

Each of the three sections of the Pressey *Test* contains 25 lines with five words each. In Test I the *disapprovals,* or words considered wrong, are crossed out; in Test II the *worries;* and in Test III the *interests.* The number of words crossed out on each test gives the *affectivity* score for that test and is interpreted as indicating the tendency to emotionalize. Another phase of the test requires the subject to encircle the one word in each line to which he has the strongest reaction. The number of encircled words which deviate from the modal choice of the group constitutes what Pressey calls the *idiosyncrasy* score. The extent to which the subject tends to encircle the modal words is considered indicative of the extent to which he is conventionalized in feelings and attitudes. A few such deviations are of no importance but a large number of deviations indicates that the subject is in some ways "peculiar," and the score is, therefore, considered an index of emotional adjustment.

The highest obtainable affectivity score for each of the three tests is 125. The highest possible idiosyncrasy score which the most "peculiar" person could make is 25 for each test. An individual completely conventionalized as to attitudes would make an idiosyncrasy score of zero.

In 1924, Thompson and Remmers (47) gave the Pressey *Test,* Form *A*, to sophomore students at Purdue University in an attempt to determine the reliability of the test. The tests were given on two occasions, three months apart, and were found to have a reliability coefficient of .482 for the affectivity score, and .39 for the idiosyncrasy score. The scores were also correlated with psychology grades, averages for all grades, and *IQ,* but were found to have no appreciable correlation.

Another attempt to determine the reliability of Form *A* was undertaken by McGeoch and Whitely (31). The test was given to three groups of sophomores at Washington University, each group being retested after intervals of 48 hours, 45 days, and 90 days. The mean affectivity scores and the mean idiosyncrasy scores were obtained for each of the four tests and in Test IV, which is Test II in Form *B,* the words representing worries were arranged according to Pressey's classification as they might appeal to five classes of people, the suspicious (paranoid), "jumpy" (neurotic), self-conscious (shut-in personality), melancholic, and hyperchondriacal, the average number of words crossed out for each of the five classifications being obtained.

On the affectivity scores the coefficients of reliability were found to be fairly high after the 48-hour interval, ranging from .82 on the test involving wrongs or disapprovals to .867 on the test for worries. After the 45-day interval the coefficients of reliability decreased to .795 and .750, and after the 90-day period there was a still greater decrease to .652 and .511.

McGeoch and Whitely say:

> If we assume that the Pressey X-O tests measure what they are designed to measure, this decrease in the consistency of the measurement with increasing time interval would seem to indicate that the affectivity scores represent, with any high consistency, only the temporary emotional status of an individual. Prediction from the results of the tests regarding later or permanent affective spread, in any precise fashion, would be very doubtful (31, pp. 262-263).

These authors also made a qualitative analysis of the number of words crossed out on each of the retests, i.e., the tendency to be consistent in crossing out the same words on each testing. On both the affectivity and the idiosyncrasy scores there was found to be a steady increase in the inconsistency of response with increasing time interval. This difference, which is not discernible in the study of quantitative data, was most pronounced in the worries test, while the test involving disapprovals showed the least change. The experimenters believed these results to be due to "actual changes in the affective organization of the individual" brought about by the stimulating conditions common to the life of college sophomores. They were of the opinion that "the remarkable fact is, not that the reliability of these tests should decrease with time, but that it should be so high after 48 hours, and then decrease as slowly as it does."

In the work of Landis, Gullette, and Jacobsen (28) at the University of Minnesota, 23 students, all known to each other, were required to rate one another as to degree of emotional stability. These ratings were then correlated with the Pressey *X-O* scores for affectivity and idiosyncrasy. The affectivity scores correlated with emotional rating scale estimate No. 1, i.e., very stable emotionally, .24±.14; and the idiosyncrasy scores correlated with the same stability rating .52±.10. There was a correlation of —.40±.15 between the two Pressey scores. When the number of cases was increased by 129 the correlation changed from —.4 to —.02. These authors believed it to be impossible to standardize the test for all groups or communities as the attitudes involved in the test are largely a product of the immediate environment and vary according to areas, and according to the individual's background.

According to Buck (6), one of the most valuable uses of the test is to indicate changes in social trends, as well as age and sex differences. This may be seen in a comparison of the work of Chambers (8) in 1923 with that of Buck 10 years later. Chambers gave the Pressey *Test*, Form *B*, to about 3,000 students from Grade 7 through senior year in college. He found that in going up the grade scale there was a marked decrease in the number of moral taboos as shown in Test I, a decrease in the number of worries, "a slight narrowing and then a shifting and broadening of interests." At the seventh grade level boys had more disapprovals, in Test I, than the girls and tended to discard them earlier than girls; at the close of the high school age boys scored about the same as sophomore college girls, but by the late college years girls had a lower mean affectivity score for Test I than was found for men of the same grade. Throughout the tests the boys and men showed more interests than girls and women.

In repeating the tests on about 1,000 college students from the same institution 10 years later, Buck found considerable liberalizing of opinion among underclassmen, as expressed in a decrease affectivity score for Test I. There was but slight change in the number of worries; and a small decrease in the number of interests among college men. Buck concluded that Test I showed a ready influence by the mores, and this was reflected in the qualitative analysis of the words crossed out. This test especially, reflected social change while worries remained most constant, and interests showed but slight change.

In using this test for psychotic patients, Flowers (16) found their total affectivity scores to be lower than for nonpsychotic persons, while the idiosyncrasy scores were higher for the psychotic group. The psychotics who improved during hospitalization had a lower idiosyncrasy score than those classified as "unimproved," while the affectivity score remained the same for the two groups. Ziegler (49) also considered the Pressey *Test,* especially Test II concerning worries, as of value in detecting mental disturbances. Psychotic patients were found to score high on the classification scheme in which their particular mental deviation was found. Thus paranoid patients were found to cross out a greater number of "paranoid" words than nonpsychotic persons.

C. Experimental Studies of the Effect of Sibling Rank upon Aggressiveness

Adler attached great importance to the effect of order of birth upon personality adjustment. He believed that each child faced a different situation because of his position in the sibling constellation, that submission could not be tolerated permanently and that feelings of inferiority and uncertainty invariably gave rise to a striving for a higher or superior level in order to obtain compensation. His theory, based upon clinical contacts rather than laboratory experiments, laid much emphasis upon the sex of the sibling group as well as the numerical position of the child within the group. Thus between two brothers or two sisters, the older has reached a certain stage of development before the arrival of the younger child. The younger becomes aware of his position as the weaker or more helpless of the two and attempts to compensate for his feeling of inadequacy by striving to overtake the older sibling. If, however, the older child is a boy and the younger a girl, the girl may be spurred to even greater efforts to overtake her older sibling because of the favored position given boys over girls in most homes. If the girl is unusually intelligent, this competition often frightens the boys and results in a feeling of "dethronement" and defeat which usually gives rise to strong maladjustment by the ages of 14 or 16, and a desire to retreat or daydream about his former unique position of power when he was an only child. "As a result the younger is usually more active and aggressive. . . The youngest children in families bear unmistakable signs of the fact that they have been the youngest" (1, p. 1281). Adler believed that youngest children had the greatest incentive to strive to surpass others, while oldest children, especially boys were apt to be more conservative and less dominant than their younger siblings. If the feeling of inferiority becomes intensified to the extent that the child fears he may never be able to overcome his weakness, then his fear drives him to extraordinary efforts to seek compensation and the result is over-dominance, violent impulses, haste and impatience. These are the children who are often noticeable because of exaggerated movements toward their "exaggerated goal of dominance." Since this desire is an asocial one, involving hostility toward others, the aggressiveness of these children is apt to bring them into conflict with their environment. Thus the characteristic of dominance is desirable according to its degree of moderation.

Since Adler advanced his theory of the importance of sibling rank, many experiments have been made in this field with many conflicting results. Some of the more important ones are briefly given here.

In 1933 Campbell reported, as a result of his study on 200 college students, half of whom were "only" children, that children without siblings appear to develop unusual personality traits. Boys raised as only children scored higher on tests for neuroticism, self-sufficiency, and dominance than boys raised as intermediate children. Girls raised as only children scored higher on ratings of neuroticism and introversion and scored lower on tests of dominance and self-sufficiency than girls with siblings. Both boys and girls, when raised as only children, made significantly more variable scores than the sibling group.

Eisenberg (14) found in his experiment on 454 college students of a high socio-economic level, that children raised as first and only children tend to feel more dominant than intermediate and youngest children, with youngest rating the least dominant. These differences, found by the Maslow *Social Personality Inventory*, were for men students with a slight suggestion of the same trend in women students.

Stagner and Katzoff (45), using the Bernreuter *Personality Inventory* on 430 students at the University of Wisconsin, found no significant difference in the characteristic of dominance for the order of birth. Their results differed from those of Guilford who found, in her study of 163 Junior High School pupils, that more initiative and dominance were shown by only children than by children with siblings.

A younger age group was studied by Goodenough and Leahy who found that, among 300 kindergarten children rated by teachers' estimates, the oldest child had least aggressiveness and self-confidence. The intermediate child tended to lack aggressiveness, but slightly less than the oldest child, while the youngest child showed no marked tendency either way. The only child showed most aggressiveness and self-confidence.

Fenton (15) was unable to substantiate the views of Andrus, Blanton, Hall and others that the only child had less desirable traits than children with siblings. His work on about 200 children in the lower grades, rated by teachers according to the Blanton scale, gave a very similar rating for only children and children with siblings on aggressiveness, emotional stability, etc. Both Fenton and Stuart found no relation in birth order and normal emotional make-up among college students.

III. EXPERIMENTAL PROCEDURE

A. Subjects Used

1. *Selection on Basis of Parental Occupation*

The children chosen for this experiment were selected on the basis of their fathers' occupation, the occupational status being determined by the classification used by Edwards (13), Bureau of the Census. This grouping attempts to combine all persons belonging to the same general socio-economic class without reference to the individual occupations within the class. The occupational groups, as listed by Edwards, consist of six divisions: (*a*) professional persons; (*b*) proprietors, managers, and officials; (*c*) clerks and kindred workers; (*d*) skilled workers and foremen; (*e*) semiskilled workers; and (*f*) unskilled workers.

In this study, in order to present a real contrast in socio-economic status, the children of two widely divergent socio-economic groups were selected; namely, the professional and semiskilled. The semiskilled group was chosen in preference to the unskilled because of the great predominance of colored and foreign families comprising the unskilled group. There was also the disadvantage of having classified as "unskilled" all persons with no occupation. Only white children of American-born parents were used in this study.

The various professional occupations, as listed by Edwards, and included in this study were: authors, editors, and reporters; chemists, and metallurgists; clergymen; college professors; dentists; designers and draftsmen; lawyers and judges; musicians and teachers of music; physicians, surgeons, and psychiatrists; teachers; technical engineers; religious workers; other professional pursuits included army, navy, and marine officers, and scientists. The semiskilled occupations included in this study were: apprentices to building and hand trades; attendants in bowling alleys and golf clubs; bakers; boatmen; canal men and lock hands; boiler washers; brakemen on railroads; boarding and lodginghouse keepers; chauffeurs and truck drivers; dressmakers and seamstresses (not in factories); dyers; deliverymen for bakeries, stores and laundries; guards, watchmen, and doorkeepers; hairdressers and barbers; housekeepers; milliners; motormen on steam and street railways; nurses (untrained); oilers of machinery; operatives in cleaning, dyeing, and pressing shops; sailors, soldiers, and marines; switchmen and flagmen on steam and street railroads; telegraph and telephone linemen; and theater ushers.

Edwards writes that "those occupations are considered semiskilled for the pursuance of which only a short period or no period of preliminary training is necessary, and which in their pursuance *call for only a moderate degree of judgment or of manual dexterity.*"

2. *Selection of Schools*

The subjects consisted of 319 children in Grades 6*A* and 6*B* from 15 public schools in Washington, D. C. The sixth grade was chosen because at a lower grade level the families would have been less complete as to siblings and therefore sibling rank would have been of less value in the case of only and youngest children. At a higher grade level there would have been a selective factor due to children of the poorer areas being sent to vocational schools, and the additional factor of adolescent disturbances in behavior.

The schools were located in five different parts of the city where monthly rental of tenant-occupied dwellings varied from $25.00 a month to $75.00 and over.[2] The distribution of schools used in these areas is given in Table *A*.

TABLE *A*

	Average monthly rental	Number of schools tested
High rental range	(1) $75.00 and over	2
	(2) $50-$74.99	4
Intermediate	(3) $40-$49.99	2
Low rental range	(4) $30-$39.99	4
	(5) $25-$29.99	3
	(6) $25 and under (mostly colored districts)	0

From the above it will be seen that the schools were located in both the higher and the lower rental ranges, and two schools were located in the intermediate rental range. In selecting the schools in which testing was done, an attempt was made to use the poorer areas in which children of semiskilled workers were found, the wealthier areas in which children of professional men predominated, and areas between those two in which were found children of the more prosperous semiskilled and the less prosperous professional groups.

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[2] Average monthly rental as to areas was drawn up by a real property inventory by the Department of Research of the Washington Council of Social Agencies.

Of the 319 children tested, there were 92 boys and 74 girls whose fathers were professional men, and 61 boys and 92 girls whose fathers were semiskilled workers. Fifty-two children lived in areas not representative of the occupation of their fathers; that is, 31 children whose fathers were professional men lived in neighborhoods occupied by nonprofessional families, and 21 children whose fathers were semiskilled workers dwelt in economically superior neighborhoods. The remaining 267 children lived in neighborhoods representative of their socio-economic groups.

All of the children in the sixth grade of the schools in which testing was done, were given the tests if their fathers were in either of the two occupational groups studied and if the parents were American born. There were no other selective factors. In the schools located in Areas 2, 3, 4, and 5, a considerable number of children were excluded from the tests because of this occupational selection. However, in Area 1 none needed to be excluded.

B. METHOD OF PROCEDURE

1. *Collecting Data*

Prior to giving the tests, each child's teacher and school record were consulted and the following information obtained: (*a*) intelligence quotient; (*b*) occupational status of the father; (*c*) behavior rating; and (*d*) order of birth.

The subjects had been given intelligence tests upon enrollment in the Washington schools; and retests were given about every one or two years thereafter. The tests used were the *National Intelligence Tests,* Kuhlman-Anderson, and Otis *SA*. The intelligence quotients of these tests were averaged and the resulting score considered as the child's *IQ*. All but the children enrolled within a year had been given more than one test, and many of them had been tested three or four times.[3] In a small percentage of cases where the pupils' school achievement differed from work expected on their *IQ* level, the Stanford-Binet test was given. In such instances, the averaged *IQ* obtained by group tests was discarded and the result of the Stanford-Binet was considered as the child's *IQ*.

The occupational status of the father, as obtained from the school record, was based on information sent by the parents in a questionnaire at the time of the child's enrollment in the school. This information was checked with the teacher's knowledge of the family and, where the exact occupation was ambiguous, the case was discarded.

The teachers were asked to rate the degree of emotional stability of each child as 1, 2, 3, or 4; rating 1 meaning above average in poise and stability, 2 average, 3 nervous and unstable, and 4 a severe behavior problem.

Information regarding the child's sibling rank was obtained from the child. All living siblings were included in the size of the family whether or not they were living in the home at the time.

2. *Administering the Tests*

The tests were given in the school classroom. Disturbing influences were reduced to a minimum; recess bells were not rung and the tests were given without interruption except for a brief rest period between the two tests. The teachers were not present during the testing. The number of children tested at any one time ranged from 11 to 33.

The instructions given in the tests manuals were carefully followed. There was no time limit on either test. Most children completed the Pintner test in 20 minutes, although the time required ranged from 10 to 30 minutes. The Pressey test required from 45 minutes to 1½ hours for completion.

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[3] The validity of obtaining an *IQ* in this manner may be questionable. However, due to the practical impossibility of giving the Stanford-Binet test to such a large number of children, it was considered in this case that the utilization of several group tests given over a period of years, presented a more accurate gauge of the child's intelligence than the results of a single goup test.

The intelligence quotients were computed by the Department of Research, Board of Education.

The subjects reacted to the *Aspects of Personality Inventory* with considerable interest and regarded it as an amusing game. During the Pressey *X-O* test there were indications of restlessness, especially on the latter part of the test which required the encircling of words. The vocabulary of the Pressey test seemed too advanced for the children in this group, although the test is standardized for this grade.

3. *Scoring the Tests*

In scoring the *Aspects of Personality Inventory* a stencil key was used which permitted only positive answers to appear. The score was obtained by counting these answers and giving one point for each correct response. Thus the total score appears as measuring positive characteristics; i.e., ascendance, extroversion, and emotional stability, which are indicated if the score is 17 or more. A very low rating, a percentile rank of 25 or less, is considered by Pintner to be indicative of personality trends which may merit special attention. The percentile norms as given by Pintner in the manual are shown in Table 7.

A very low score on the *A-S* test would indicate a submissive, docile person in need of encouragement to assume responsibilities, while a high score, about the 90 percentile rank, Pintner believes, may indicate over-aggressiveness and a domineering attitude. On the *E-I* test a very low score indicates an introvertive tendency or an extremely high score suggests a lack of inhibition. A very low rating on the *E* test is considered to be indicative of a psychoneurotic type of personality, which would need individual study and treatment.

In scoring the Pressey *X-O* test, the affectivity scores were obtained by counting the number of words crossed out on each of the three tests. Norms for affectivity scores, showing the average number of words crossed out for boys and girls on each grade level, were obtained in 1922. These norms begin at the seventh grade level and continue through the senior college year. Since no norms for the sixth grade were available, they were estimated from the given norms. These estimated norms are given in Table 15.

The total affectivity scores; i.e., the added affectivity scores of the three tests, were not used in this study as Pressey has emphasized that these total scores are the blurred result of various factors which may tend to cancel each other, and are therefore of little importance.

The only modal choices available for computing the idiosyncrasy score, and the idiosyncrasy norms, were for college students. Since these could not be used for this study, local modal choices were obtained by counting the number of times each word was encircled on all the tests. These most common choices of words encircled were obtained separately for boys and girls in both the professional and semiskilled groups. Since the choice of words, in terms of the percentage of children encircling them, differed considerably between boys and girls but not between the occupational-sex groups, these modal words are given for boys and girls irrespective of occupational classification. The modal word encircled on each line is given in Table *B*. Where the girls' choice differed from the boys', the word on the right is the modal word for girls.[4]

TABLE *B*

Test I	Test II
1. Smoking	Forgetfulness
2. Laziness	Sin
3. Ignorance—stinginess	Unfairness—sickness
4. Fibbing	Accidents
5. Talking back	Disease—temper
6. Slang—stubbornness	Germs—fire
7. Fretting	Habits—tuberculosis
8. War	Death
9. Meddling	Enemies
10. Thoughtlessness	Insanity—homeliness
11. Gang—faultfinding	Wrecks
12. Cowardice—temper	Suffocating
13. Butting-in	Poison
14. Fighting	Giggling
15. Betting	Nightmares
16. Idleness	Teasing
17. Cheapness	Stupidity
18. Greediness	Lies
19. Swiping	Gun
20. Lawlessness	Burglars
21. Yellowness—bullying	Twitching—crying
22. Gossip	Health
23. Bribery—poolrooms	Knives
24. Dirtiness	Germs
25. Teasing	Roughness

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[4] Modal choices were obtained for Test III but they are not listed here, as the idiosyncrasy score for this test was not used in this study.

The number of times a subject encircled a word other than the modal word given above constituted his idiosyncrasy score. This was obtained separately for Tests I and II and averaged to obtain the idiosyncrasy score.

In arranging the words for the worries test, Form *A*, Pressey classified the words as they might appeal to five classes of people, the suspicious (paranoid), "jumpy" (neurotic), self-conscious (shut-in personality), melancholic, and hyperchondriacal. The position of the classification scheme ran 5-3-1-4-2; thus on Line 1 the first, second, third, fourth, and fifth words were paranoid, neurotic, shut-in, melancholic, and hyperchondriacal, respectively. On Lines 2, 3, 4, and 5 the hyperchondriacal words held third, first, fourth, and second positions, etc. For purposes of this study the list of words pertaining to each of the five classes was obtained from Form *A* and compared with Form *B*, which contains most of the words of Form *A* but not its arrangement scheme. It was found that of the 125 words in Form *A*, 90 were retained in Form *B*. A qualitative study was made of each child's response to these 90 words for a comparative study between the two socio-economic groups and for boys and girls within each group. The words belonging to each of these five classes are found in Tables 12, 13, and 14.

IV. TREATMENT OF RESULTS

The results of this study are presented in four general sections: (*a*) the relationship between intelligence of children and parental occupation; (*b*) the relation of parental occupation and personality traits of children as measured by the Pintner test, attitudes as measured by the Pressey test, and teachers' ratings of behavior; (*c*) differences within the occupational groups as found in different areas of the same city; and (*d*) differences in the relation of sibling rank and aggressiveness as found in the two socio-economic groups.

A. Relationship between Intelligence of Children and Parental Occupation

The results of the intelligence tests, as in the case of all the remaining tests used in this study, are classified as follows:

(1) Professional group irrespective of sex.
(2) Semiskilled group irrespective of sex.
(3) Boys irrespective of occupation of their fathers.
(4) Girls irrespective of occupation of their fathers.
(5) Boys from professional families.
(6) Boys from semiskilled families.
(7) Girls from professional families.
(8) Girls from semiskilled families.

Table 2 gives the mean, median, mode, standard deviation, total range, and interquartile range of each of these groups. These statistical results were obtained according to the formulas found in *Statistical Methods Applied to Education*, by Rugg.

The *IQ* results are very similar to those of other investigators and bear the closest resemblance to findings of Collins (9), and Haggerty and Nash (24), whose experiments included children of the same grade level (see Table 1). In the present study the children of professional men rate a little lower and the children of semiskilled workers a little higher than in other investigations among elementary grade pupils in this country, but this difference is very slight. The difference in mean *IQ* between the two occupational groups is 16.1, while the means for boys and for girls, irrespective of occupational classification are identical.

In analyzing the results separately for boys and girls in the two

TABLE 2

INTELLIGENCE OF 319 CHILDREN OF PROFESSIONAL AND SEMISKILLED FAMILIES

Group		*N*	Mean	Median	Mode	Standard deviation	Total range	Interquartile range
Professional		166	111.6	111.5	110-114	11.05	77-140	105-118.0
Semiskilled		153	95.5	97.2	95-99	11.95	59-125	88-105.0
Irrespective of occupation	Boys	153	103.9	105.7	110-114	12.80	59-140	91-113.5
	Girls	166	103.9	104.6	95-99 110-114	13.60	67-138	96-115.0
Boys	Professional	92	110.1	110.0	110-114	10.60	77-140	103-117.0
	Semiskilled	61	94.7	95.5	90-94	13.75	59-125	85-103.0
Girls	Professional	74	113.5	113.7	110-114	11.44	82-138	110-122.0
	Semiskilled	92	96.2	98.0	100-104	11.20	67-122	91-105.0

occupational groups, girls are found to have a higher mean than the boys within their group, but the difference between the girls of the two occupational groups is greater than among boys; being 17.3 for girls with a standard error of 1.77 and 15.4 for boys with a standard error of 2.08. This difference is not apparent in the results by occupational groups or sex groups, due to the greater number of boys among the professional class and of girls among the semiskilled which tends to conceal the real difference found in the occupational-sex groups. The difference in average *IQ* between the sexes is small but consistent; a difference which Terman (46) reports is commonly found among children to the ages of 13.

In the present study, the *IQ* difference for boys of professional and semiskilled families has a greater range than for girls; a difference which is more pronounced at the lower end of the scale than the upper. The same results are found in the range of the middle 50 per cent, except on the range for girls irrespective of occupational class where the upper range is higher than for boys. Terman found that in interquartile range the difference in *IQ*'s of boys and girls

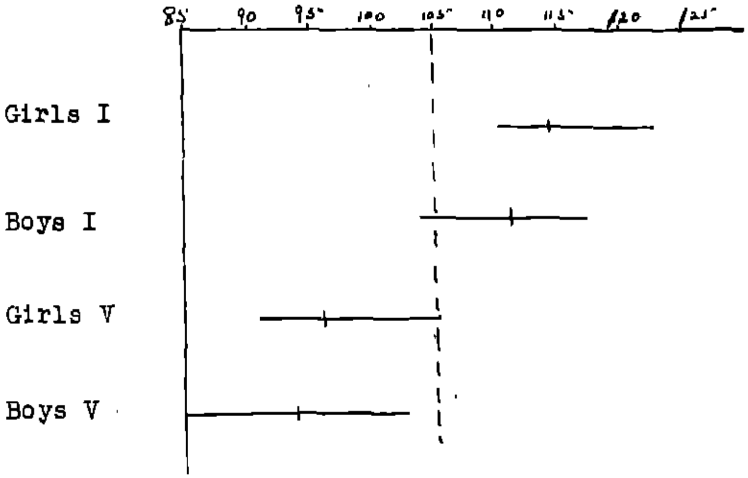

FIGURE 1

INTERQUARTILE RANGES OF CHILDREN'S *IQ*'S BASED ON OCCUPATIONAL GROUPS

(The dotted line indicates the median for the total number of children. The mark on each range line indicates the median for that group. The numerals I to V refer to professional and semiskilled groups respectively.)

was negligible, although boys are often found to have a greater range than girls. The results of this study differ from those of Terman, as is shown graphically in Figure 1.

Between the occupational groups the interquartile range scarcely overlaps, the very lowest of the professional group rating as high as the highest of the semiskilled.

In each occupational group there is a certain amount of overlapping. The dullest child in the professional group has an *IQ* of 77, which is 18 points above the *IQ* of the dullest child in the semiskilled group; and the brightest child in the professional group has an *IQ* of 140, which is 15 points above the highest score of the semiskilled group. Below the level 105.1, median *IQ* for both boys and girls, there is 24.1 per cent of the professional group and 74.5 per cent of the semiskilled group while none of the professional group and 1.9 per cent of the semiskilled group fall below 70. Comparing the upper *IQ* range, 3.6 per cent of the professional group and none of the semiskilled group rate above 130. These occupational differences in intelligence are still more pronounced when we consider that in Washington the professional men comprise 9.6 per cent and the semiskilled 15.8 per cent of the employed population. In the country at large the professional men comprise 6 per cent and the semiskilled 16.3 per cent of the working population.

Table 3 shows the percentage of boys and girls in the two occupational groups having *IQ*'s at various levels as classified by Terman: near "genius," very superior intelligence, superior, average, dull, borderline deficiency, and feebleminded. From this table it will be seen that among the professional group 59.68 per cent of the boys and 75.5 per cent of the girls rate as superior or above in intelligence, while in the semiskilled group 18.0 per cent of the boys and 11.9 per cent of the girls are found on the same level. In the two lowest categories; i.e., borderline intelligence and the feebleminded, are found 1.08 per cent of the boys of professional families and none of the girls, while among the semiskilled are 4.8 per cent of the boys and 6.48 per cent of the girls. This indicates considerable difference between occupational-sex groups and boys and girls, as well as occupational group differences, and supports the belief of Yerkes and Bridges that "at certain ages seri-

TABLE 3

Percentage of Children, Based on Parental Occupation, Found at Various *IQ* Levels

	Professional		Semiskilled	
IQ	*Boys* *N*92	*Girls* *N*74	*Boys* *N*61	*Girls* *N*92
140 and above (Near "genius")	*1.08*			
120-139 (Very superior)	14.10	31.0	4.9	4.30
110-119 (Superior)	44.50	44.5	13.1	7.60
90-109 (Average)	36.90	21.6	45.9	65.20
80-89 (Dull)	2.10	2.7	31.1	16.30
70-79 (Borderline)	1.08		1.6	5.40
70 and below (Feebleminded)			3.2	1.08

ous injustice will be done individuals by evaluating their scores in the light of norms which do not take account of sex differences." Comparison of Tables 1 and 2 shows the importance of sex differences; previous experiments grouping boys and girls together within the same socio-economic class do not take cognizance of these differences. In this study, the greater number of girls in the semiskilled than in the professional group skews the results for girls toward the left while the still greater preponderance of boys in the professional group over the semiskilled gives the opposite effect for boys. Likewise the effect upon the occupational groups would be to lower the average score for the professional group because of the greater number of boys and to raise the score for the semiskilled group due to the greater number of girls.

There is considerable difference in *IQ* of children whose fathers are in various occupations within the professional class. The lowest mean *IQ*, 110.4, is obtained by children of engineers, and the highest mean *IQ*, 116.3, is found among children of scientists. Still greater differences within the professional group have been found in studies by Dexter, and Haggerty and Nash. The results of these

TABLE 4

INTELLIGENCE OF CHILDREN BY PROFESSIONAL OCCUPATION OF PARENTS

Profession	This study		Dexter study		Haggerty and Nash grade school study		Duff and Thompson study	
	N	Average *IQ*	*N*	Average *IQ*	*N*	Median *IQ*	*N*	Average *IQ*
Scientists	12	116.3					4	115.0
Architects	8	115.0			13	107		
Army and navy officers	27	111.5						
Physicians and psychiatrists	19	111.0	35	112	26	114		
Technical engineers	27	110.4	22	111	11	108		
Lawyers	29	110.0	30	119	53	119	4	120.0
Miscellaneous	44	112.5	9	123				
Professors			88	116				
Ministers			28	113	27	109	13	121.2
Teachers					47	118	40	116.0

experiments are given in Table 4 and seem to indicate no definite relation between various occupations within the professional group and the *IQ* of children.

B. COMPARISON OF SCORES ON PERSONALITY TRAITS AND ATTITUDES TESTS OF CHILDREN OF DIFFERING SOCIO-ECONOMIC LEVELS

1. *Three Personality Traits as Measured by the Pintner Aspects of Personality Inventory*

One of the primary problems of this study is to determine the relationship between personality characteristics of children and socio-economic status. As already stated, an attempt was made to measure three definite personality traits; i.e., ascendance-submission, extroversion-introversion, and emotional stability by means of the Pintner test.

Since one point is given for each correct response and the highest possible score is 35, each point has considerable weight. Table 5 gives the mean, median, mode, standard deviation, total range, and interquartile range for the eight classifications studied, and Table 6 shows the reliability of differences in these scores. Figure 2 shows the interquartile ranges of the Pintner scores. On all three tests the

TABLE 5

RESULTS OF PINTNER ASPECTS OF PERSONALITY INVENTORY

	Professional *N* 166			Semiskilled *N* 153			Irrespective of Occupation					
							Boys *N* 153			Girls *N* 166		
	A-S	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*
Mean	15.2	21.4	28.3	14.2	20.4	27.4	15.1	21.6	28.6	14.4	20.4	27.2
Median	15.7	21.4	28.8	14.0	20.6	27.9	15.3	21.3	29.6	14.9	21.0	28.1
Mode	15.0	23.0	27&30	15.0	20.0	30.0	15.0	20.0	23.0	13.0	22.0	19.0
Standard deviation	4.10	4.07	4.78	4.09	3.75	5.34	4.05	3.95	4.89	4.14	3.85	5.11
Total range	5-30	8-30	3-25	5-24	12-29	6-35	7-30	9-30	3-35	5-26	8-29	6-35
Interquartile range	13-18	19-24	26-31	12-17	18-23	24-31	13-18	19-25	26-31	11-17	19-22	24-31

	Boys						Girls					
	Professional *N* 92			Semiskilled *N* 61			Professional *N* 74			Semiskilled *N* 92		
	A-S	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*
Mean	15.0	21.8	28.7	15.3	21.3	28.5	15.5	21.1	28.0	13.6	19.9	26.7
Median	16.0	21.7	29.5	15.0	20.7	29.2	15.5	21.1	28.2	13.5	20.5	27.4
Mode	15&16	23.0	30.0	15.0	20.0	30&34	14.0	22.0	29.0	13.0	22.0	30.0
Standard deviation	3.6	3.95	4.11	3.85	3.98	4.46	4.03	4.1	4.27	4.04	3.56	5.58
Total range	8-30	9-30	3-35	7-24	13-28	13-35	5-26	8-29	17-35	5-22	12-29	6-34
Interquartile range	14-19	20-25	27-32	13-17	19-24	26-32	13-19	19-23	25-31	11-17	18-23	24-30

A-S=Ascendance-submission.
E-I=Extroversion-introversion.
E=Emotional stability.
Scores expressed in positive terms of letter on the left.

TABLE 6

RELIABILITY OF DIFFERENCES IN PINTNER SCORES*

	Occupational groups (Professional and semiskilled)			All boys All girls			Boys Professional and semiskilled			Girls Professional and semiskilled			Professional group Boys — girls			Semiskilled group Boys — girls		
	A-S	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*
Difference in mean	1.009	1.000	0.900	0.700	1.200	1.400	0.300	0.500	0.200	1.900	1.200	1.300	0.500	0.700	0.700	1.700	1.400	1.800
Standard error	.142	.430	.180	.145	.437	.146	.192	.208	.227	.200	.600	.243	.600	.200	.660	.206	.200	.820
Probable error	.095	.289	.121	.097	.294	.100	.129	.139	.153	.134	.404	.163	.404	.134	.445	.138	.134	.552

*Differences equal to at least three times *PE* are underlined.

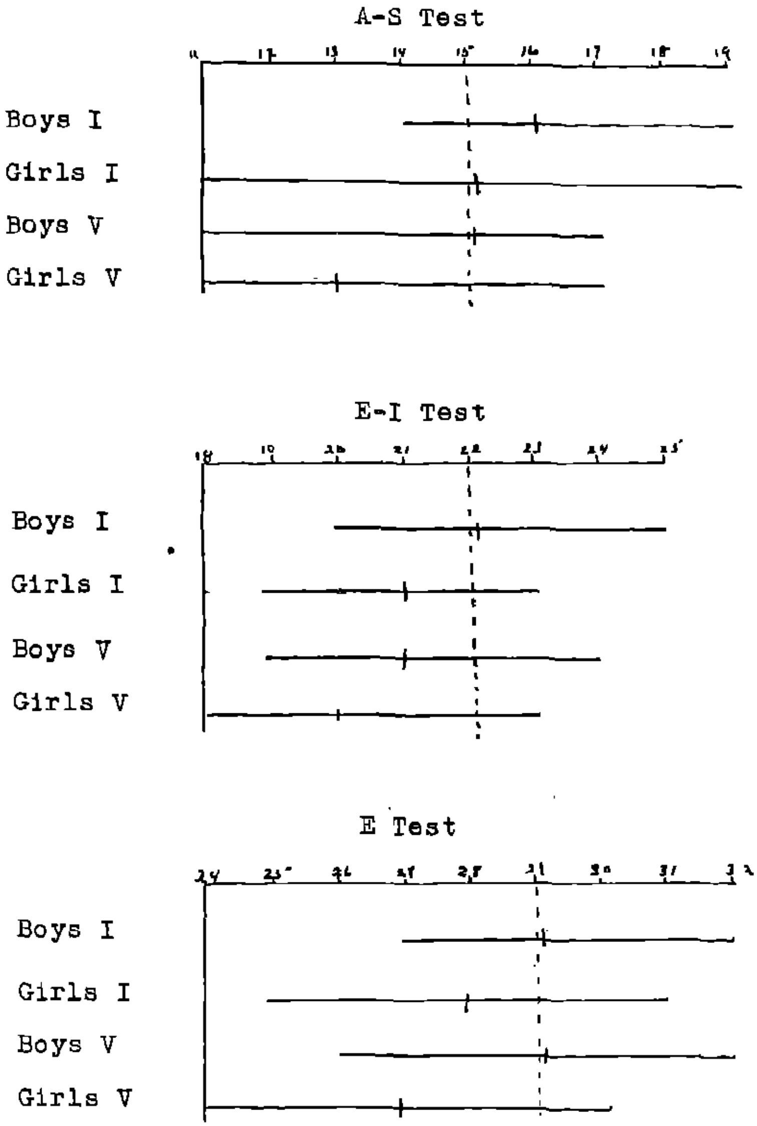

FIGURE 2

INTERQUARTILE RANGES OF PINTNER ASPECTS OF PERSONALITY INVENTORY (The dotted line indicates the median for the total number of children. The mark on each range line indicates the median for that group. The numerals I to V refer to professional and semiskilled groups respectively.)

professional group has a higher mean than the semiskilled group, the boys higher than the girls, the boys of the professional group higher than boys of the semiskilled group on all but the *A-S* test, and the girls of the professional group higher than the girls of the semiskilled. In the occupational-sex groups, the boys of the professional and semiskilled groups and the girls of the professional group have an average difference of 0.7 or less on all three tests, while the girls of the semiskilled group score consistently lower on all tests.

On the *A-S* test the greatest single difference in scores is between the girls of the two socio-economic levels with a mean of 15.5 for girls from professional families and 13.6 for girls from the semiskilled. The standard deviation and interquartile range show that this difference is not due to spread of the middle 68 per cent or the middle 50 per cent. Differences in total range of score show girls of professional families to have a higher range than girls of semiskilled families, but not for girls of the semiskilled families to have a lower range. The 25 percentile for girls of professional families and the 50 percentile for girls of the semiskilled are both 13. The upper third of the interquartile range for girls of the professional group and the lower third for girls of the semiskilled group do not overlap, thus showing a distinct tendency for girls of professional families to have scores concentrated to the right of those for girls of semiskilled families. That this difference in the characteristics of dominance between the girls of the two occupational groups is a reliable one is shown in Table 6; the difference in mean score is over 14 times its probable error.

The percentile scores obtained by children in this study and the percentile norms as given by Pintner in the manual are given in Table 7. Pintner declares that "these norms are tentative, pending the accumulation of more data," and Grades 4, 5, and 6 are given one set of norms due to the slight relationship between test scores and grade placement. A comparison of the percentile rank of these two tables show that girls of the professional group are found to rank higher than the Pintner norms, and the girls of the semiskilled group tend, on the whole, to rank below his norms. The boys of both occupational groups rank below these norms except for the professional group at the 25 percentile point. This indicates

TABLE 7

PERCENTILE RANK FOR EACH SECTION OF PINTNER TEST SEPARATELY FOR BOYS AND GIRLS OF THIS STUDY AND PINTNER NORMS

Percentile rank	Scores corresponding to percentile rank																	
	Boys									Girls								
	Professional			Semiskilled			Pintner norms			Professional			Semiskilled			Pintner norms		
	A-S	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*	*A-S*	*E-I*	*E*
100	30	30	35	24	28	35	29	30	35	26	29	35	22	29	35	27	30	35
75	19	25	32	17	24	32	19	23	30	19	23	31	17	23	30	18	23	30
50	16	22	29	15	21	29	16	20	26	15	21	28	13	20	27	15	20	25
25	14	20	27	13	19	26	13	18	22	13	19	25	11	18	24	12	18	21

that the children used in the present study rank lower in the characteristic dominance than those in the Pintner study, with the exception of girls from professional families who rate considerably higher.

The tendency for boys as a group to score higher than girls in the characteristic of dominance was found also by Gilliland (20), who reported that college men tended to rate higher and show less variability than college women.

Bender (3) found a correlation of +.0008 ±.049 between ascendance, as measured by the Allport *A-S Test,* and *IQ*. In the present study the correlation between the Pintner *A-S Test* and *IQ* is slight, but on the whole the relationship is positive. These correlations for boys and girls in each occupational group are given in Table 8.

As shown in Table 5, the results of the *E-I* test are similar to those of the *A-S* test except that the difference between girls of the two occupational groups is more pronounced for ascendance than for extroversion. A score reliably higher in extroversion was obtained by the professional group as compared to the semiskilled group, boys as compared to girls, and boys and girls of the professional group as compared to children of the same sex in the semiskilled group.

A comparison of the quartile ranges of the *E-I* scores obtained in this study with those of the Pintner study (see Table 7) show that the boys and girls of both occupational groups rate higher in extroversion than children of the Pintner group. This difference in the two studies is more pronounced among boys than girls. Both boys and girls of the professional group have a lower range than those of the semiskilled group.

The tendency for girls to score lower for extroversion than boys, and to be more variable has been found by Gilliland and others.

In emotional stability, as measured by the Pintner *E* test, there is a reliable difference between the two occupational groups. The professional group scores higher than the semiskilled group, professional girls higher than semiskilled girls, and boys of each occupational group higher than the girls within the group. On this test, as on the other two sections of the inventory, the professional girls have about the same mean score as the boys of the two occupa-

TABLE 8

CORRELATIONS OF *IQ*, PERSONALITY TRAITS, AND ATTITUDES

Variables correlated	Sex and group	*N*	*r*	*PE*
1. *IQ* and Pintner *E* Test	Boys I	92	—.111	.066
	Boys V	61	+.079	.066
	Girls I	74	+.169	.077
	Girls V	92	+.140	.066
	Boys I and V	153	—.045	.055
	Girls I and V	166	+.193	.052
2. *IQ* and Pintner *A-S* Test	Boys I	92	+.091	.066
	Boys V	61	—.099	.079
	Girls I	74	—.009	.080
	Girls V	92	+.180	.064
	Boys I and V	153	+.063	.054
	Girls I and V	166	+.201	.052
3. Teachers' Behavior Rating and Pintner *E* Test	Boys I	92	—.011	.067
	Boys V	61	—.054	.080
	Girls I	74	+.009	.080
	Girls V	92	—.004	.067
	Boys I and V	153	—.045	.055
	Girls I and V	166	—.013	.055
4. Pintner *A-S* and *E* Tests	Boys I	92	—.105	.066
	Boys V	61	—.329	.073
	Girls I	74	—.017	.080
	Girls V	92	—.036	.067
	Boys I and V	153	—.019	.055
	Girls I and V	166	—.024	.055
5. Pintner *E* Test and Pressey Test 1	Boys I	92	+.001	.067
	Boys V	61	—.014	.060
	Girls I	74	—.049	.080
	Girls V	92	—.275	.061
	Boys I and V	153	—.045	.055
	Girls I and V	166	—.188	.052
6. Pintner *E* Test and Pressey Scored for Idiosyncrasy	Boys I	92	+.001	.067
	Boys V	61	—.014	.080
	Girls I	74	—.049	.080
	Girls V	92	—.275	.061
	Boys I and V	153	—.045	.055
	Girls I and V	166	—.188	.052

Numerals I and V refer to professional and semiskilled groups respectively.

Each correlation which is three times its *PE* is underlined.

tional groups, while the girls of the semiskilled group tend to score lower.

The *E* test scores show considerable difference between the children in this study and the Pintner study. The 25 percentile point for boys of professional families and boys of semiskilled families correspond with the 58 and 51 percentile, respectively, on the Pintner group. The same tendency is found among girls of both occupational levels although this difference is not as extreme as for the boys. Since the norms given by Pintner can be considered only as tentative, it is impossible to decide whether the children used in this experiment are more stable emotionally than the grade average, or whether the tentative norms are founded upon results from children more unstable than the average. Whatever the reason, the children used in this experiment rate higher in the positive characteristics of extroversion and emotional stability and lower in ascendance than the children in the Pintner study.

On the *E* test the boys of professional and the girls of semiskilled families have a considerably greater range than the boys of semiskilled and the girls of professional families, with the greatest single difference being between boys and girls of the professional families.

The tendency for boys to rate slightly higher than girls in emotional stability has been found by many investigators. Mathews (30) found that on the Woodworth-Mathews *Psychoneurotic Inventory* girls had a higher median, indicating less stability, than boys. She also found that girls showed greater variability, and that differences in scores between boys and girls became more pronounced with increased age. Correlation between scores for neurotic tendency and *IQ* was —.201 for boys and —.055 for girls, indicating a slight tendency for bright girls to give fewer unfavorable responses than dull girls, and in the case of the boys this tendency was even more pronounced. In the present study, *IQ* and emotional stability, as measured by the Pintner *E* test, showed a tendency to correlate positively for all groups except boys of professional families. These correlations are given in Table 8.

A tendency for intelligence and emotional stability to correlate positively was found also by Pintner (37) in an experiment on 50 graduate students given the Thurstone *Personality Schedule* and the Bernreuter *Inventory*. That intelligence seems to be positively correlated with desirable traits is indicated by the following studies: Hartshorne and May found a correlation of +.16 between tests of service and intelligence. They found dull children to be less helpful and charitable than bright children; but the brightest children were not more helpful than those of average intelligence. Maller found that coöperation and intelligence correlated +.14; Hartshorne and May found intelligence to correlate +.69 with moral knowledge; and Otis found that it correlated —.75 with suggestibility. Brown found a correlation of +.40 between intelligence and caution; and Symonds, of +.28 between liberalism and intelligence.

In the present study intelligence scores tend to correlate positively with ascendance and emotional stability, but ascendance and stability correlate negatively. Pintner (38) also found the tendency for emotional stability to correlate with submissiveness rather than with ascendance.

2. *Emotional Attitudes as Measured by the Pressey X-O Test, Form B*

The results of the Pressey *Test* are compared by (*a*) occupational groups; (*b*) sex groups; and (*c*) occupational-sex groups.

a. Occupational group differences. The children from professional families score higher on Test I and lower on the other two tests than the children of semiskilled families. These results are given in Table 9. The results of the idiosyncrasy scores are about the same for the occupational groups.

The greatest occupational group difference is found on the worries test, the children of semiskilled families averaging 14.7 points higher than the children of professional families. In Figure 3, showing the interquartile range of each subtest, a marked occupational group difference in Test II is apparent. This is the only attitudes test on which boys and girls show a greater similarity of score within each occupational group than within their sex groups irrespective of occupation.

In Test II, Form *A*, Pressey gave a classification scheme for the words as they might appeal to five classes of individuals: suspicious (paranoid), "jumpy" (neurotic), self-conscious (shut-in personality), melancholic, and hyperchondriacal. Ninety-one words of Form *A* were retained in Form *B*, and in the present study each subject's score was analyzed according to the number of words crossed out in

TABLE 9
RESULTS OF THE PRESSEY *X-O* TEST

	Professional *N* 166			Semiskilled *N* 156			Irrespective of occupation					
							Boys *N* 153			Girls *N* 166		
	Test			Test			Test			Test		
	I	II	III	I	II	III	I	II	III	I	II	III
Mean	78.3	35.3	50.7	74.3	50.0	54.5	76.5	47.5	50.3	76.3	37.7	54.6
Median	79.1	31.1	49.6	78.4	37.1	53.5	79.7	33.3	47.2	78.5	34.4	54.3
Mode	50-54& 90-94	25-29	40-44	90-94	30-34	40-44	50-55	25-29	35-39	90-94	35-39	55-59& 65-69
Standard deviation	26.05	22.73	21.86	26.30	25.61	22.74	27.55	26.17	21.84	24.92	22.74	22.60
Total range	0-125	1-117	9-113	24-123	1-123	10-121	0-125	1-123	9-121	21-123	1-120	9-118
Interquartile range	57-100	20-48	35-67	54-97	26-58	38-67	52-102	23-56	34-64	61-97	22-49	39-68

TABLE 9 (*Continued*)

RESULTS OF THE PRESSEY *X-O* TEST

	Boys						Girls					
	Professional *N* 92			Semiskilled *N* 61			Professional *N* 74			Semiskilled *N* 92		
	Test			Test			Test			Test		
	I	II	III	I	II	III	I	II	III	I	II	III
Mean	77.9	38.9	49.5	74.5	60.5	51.4	78.8	31.0	52.2	74.3	43.1	56.6
Median	77.0	33.0	45.0	82.6	33.5	48.0	34.0	29.8	53.4	77.3	39.3	55.0
Mode	50-54	25-29	35-39& 40-44	90-94	30-34	25.29	90-94	15-19	40-44	60-64	35-39	55-59& 63-69
Standard deviation	25.50	26.20	19.80	29.40	27.30	23.30	28.5	18.20	25.80	23.70	24.10	21.6
Total range	0-125	1-117	9-113	24-123	3-123	10-121	21-123	1-89	9-97	26-119	1-120	15-118
Interquartile range	54-103	23-49	35-65	47-99	22-59	33-63	64-99	17-42	35-67	60-94	29-57	41-69

Test I = Disapprovals
Test II = Worries
Test III = Interests

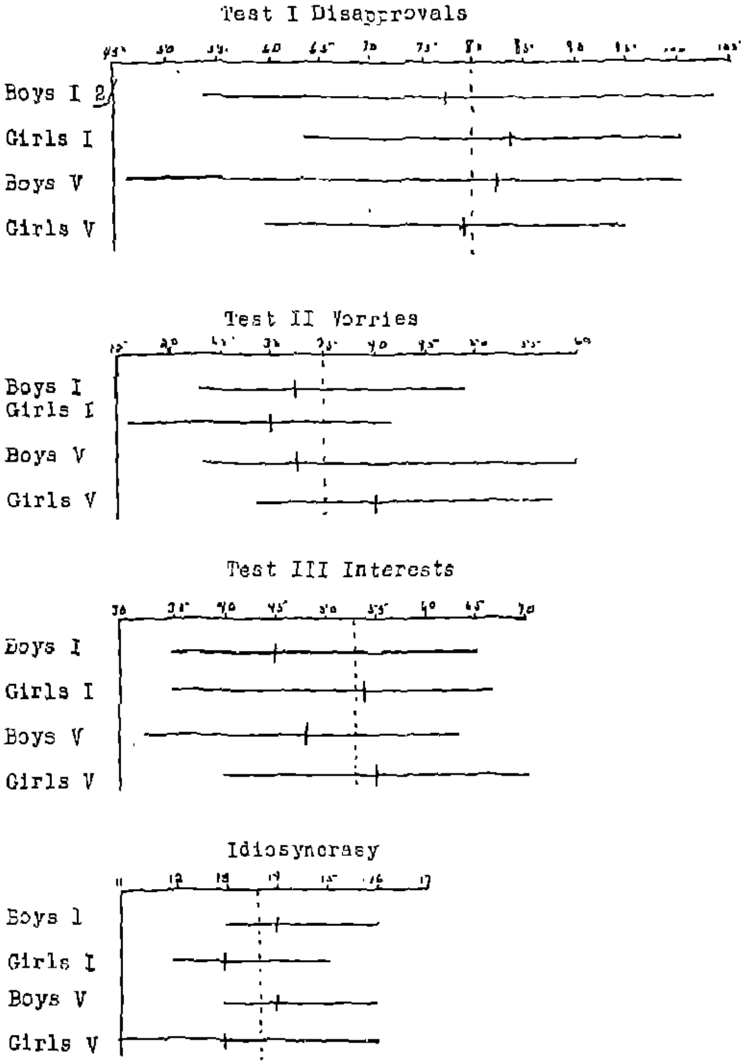

FIGURE 3

INTERQUARTILE RANGES FOR PRESSEY *X-O* TESTS

(The dotted line indicates the median for the total number of children. The mark on each range line indicates the median for that group. The numerals I and V refer to professional and semi-skilled groups respectively.)

each of these five classifications. In all classes of words the semiskilled group score higher than the professional group. These differences, given in Tables 10 and 11, are pronounced for all types of words, especially hyperchondriacal, and indicate a greater difference between the occupational than between the sex groups.

TABLE 10

OCCUPATIONAL AND SEX DIFFERENCES IN TYPE OF WORDS CROSSED OUT ON PRESSEY *X-O* TEST II

	Occupational group difference		Sex difference	
	Semiskilled exceed professional		Boys exceed girls	
Type of words	Average per cent	Ratio	Average per cent	Ratio
Suspicious	5.4	1.2:1	4.0	1.14:1
Hyperchondriacal	10.6	1.3:1	—.5	1:1.01
Melancholic	8.3	1.27:1	1.1	1.03:1
Self-conscious	7.4	1.39:1	.5	1.01:1
Neurotic	6.4	1.22:1		

b. Sex differences. Boys and girls have about the same average score on the disapprovals test but boys show greater variability. The interquartile ranges, given in Figure 3, show greater similarity between boys of each occupational group and girls of each occupational group than between occupational groups irrespective of sex. Between the two occupational groups the lowest quartile for girls differs only four points and for boys seven points, while for boys and girls of the semiskilled group there is a difference of 13 points, and for boys and girls of the professional group the difference is 10 points.

The greatest difference between boys and girls, as between the occupational groups, is found on the worries test with an average score of 9.8 points higher for the boys. On all but hyperchondriacal words boys score higher than girls, but this difference is pronounced in words only of the "suspicious" type.

The girls have a higher affectivity score for Test III and a slightly lower idiosyncrasy score than boys. The average idiosyncrasy scores, that is the mid-average for Tests I and II are: boys of professional families, 14.5; boys of semiskilled families 14.8; girls of

TABLE 11
AVERAGE PER CENT OF WORDS CROSSED OUT IN EACH CLASSIFICATION OF PRESSEY *X-O* TEST II

	Suspicious (paranoid)	Hyperchondriacal	Melancholic	Self-conscious (shut-in personality)	Neurotic
Boys Professional	30.6	37.6	33.3	20.5	31.3
Boys Semiskilled	33.3	44.1	36.6	26.6	33.1
Girls Professional	23.3	32.3	26.6	17.3	26.8
Girls Semiskilled	32.6	46.4	38.8	26.3	36.8
Professional group (irrespective of sex)	27.3	35.2	30.0	18.9	29.0
Semiskilled group (irrespective of sex)	32.7	45.8	38.3	26.3	35.4
All boys	32.0	40.0	34.4	22.6	32.2
All girls	28.0	40.5	33.3	22.1	32.2
Ratio Boys—professional to semiskilled	1.08:1	1.17:1	1.09:1	1.28:1	1.05:1
Ratio Girls—professional to semiskilled	1.30:1	1.44:1	1.45:1	1.52:1	1.36:1

professional families 13.6; and girls of semiskilled families 13.5.

c. Occupational-sex differences. On all three tests, the differences found between the occupational groups are found also between the occupational-sex groups. Although the occupational group differences in Test II are greater than the sex differences, the boys show less difference than the girls and there is less difference between boys and girls in the semiskilled group than in the professional group. Tables 12, 13, and 14 show that the greatest single difference in type of words crossed out is between girls of the two occupational groups, with girls of the professional class rating con-

TABLE 12

NUMBER OF CROSS-OUTS OF SUSPICIOUS AND SELF-CONSCIOUS WORDS ON BASIS OF OCCUPATIONAL-SEX GROUPS

Suspicious (paranoid) words	Professional Boys	Professional Girls	Semiskilled Boys	Semiskilled Girls
Poison	43	22	34	46
Enemies	52	33	34	63
Boss	21	12	20	17
Neighbors	15	12	17	23
Insult	29	19	23	32
Sneer	28	15	14	21
Unfairness	49	32	31	49
Persecution	20	11	8	16
Suspicions	26	20	21	32
Rivals	30	14	18	22
Teasing	36	20	28	42
Employer	9	1	4	7
Faultfinding	30	20	28	38
Whisperings	20	14	13	29
Teachers	24	14	15	17
Total	432	259	308	454
Average	4.6	3.5	5.0	4.9

Self-conscious (shut-in personality) words	Professional Boys	Professional Girls	Semiskilled Boys	Semiskilled Girls
Self-consciousness	24	22	15	28
Clothes	26	17	16	32
Blushing	23	18	19	29
Queerness	25	9	24	23
Marriage	9	8	11	13
Impulses	11	8	11	10
Girls[1]	22	5	19	23
Homeliness	13	13	20	32
Stammering	20	8	12	27
Parties	8	7	13	17
Awkwardness	38	25	24	47
Manners	36	30	20	39
Boys[1]	9	9	14	19
Longings	17	19	19	29
Moodiness	19	15	13	24
Dances	10	3	10	13
Giggling	31	18	20	36
Jokes	9	4	14	10
Engagements	12	7	12	14
Total	367	245	306	465
Average	3.9	3.3	5.0	5.0

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[1] Girls listed as "women" and boys listed as "men" in Form *A*.

TABLE 13

NUMBER OF CROSS-OUTS OF MELANCHOLIC AND HYPERCHONDRIACAL WORDS ON BASIS OF OCCUPATIONAL-SEX GROUPS

Melancholic words	Professional Boys	Professional Girls	Semiskilled Boys	Semiskilled Girls
Discouragement	42	31	23	42
Conscience	25	19	19	28
Failure	56	36	34	51
Religion	11	6	8	19
Sin	54	35	33	58
Forgiveness	19	13	14	28
God	10	6	8	10
Blues	32	15	21	35
Ruin	26	17	25	25
Depression	27	17	19	29
Loneliness	27	29	26	40
Soul	9	0	5	13
Helplessness	23	14	16	31
Forgetfulness	57	44	40	58
Worry	46	27	42	52
Crying	21	10	16	33
Grave	23	13	23	41
Death	45	25	35	59
Total	553	357	407	652
Average	6.0	4.8	6.6	7.0

Hyperchondriacal words	Professional Boys	Professional Girls	Semiskilled Boys	Semiskilled Girls
Germs	46	25	32	50
Sickness	54	40	40	67
Dizziness	26	23	29	38
Disfigurement	33	17	20	34
Fainting	19	14	17	31
Pain	41	38	34	57
Headache	44	32	32	56
Food	12	7	11	15
Weakness	33	22	27	59
Disease	49	35	33	47
Smoking	38	23	21	27
Medicine	26	21	17	36
Tuberculosis	40	20	26	41
Nervousness	25	31	32	53
Suffocating	35	19	33	40
Insanity	25	15	22	37
Germs*	45	30	35	46
Total	591	412	461	734
Average	6.4	5.5	7.5	7.9

*This word was listed twice in both Forms *A* and *B*.

TABLE 14

NUMBER OF CROSS-OUTS OF NEUROTIC WORDS ON BASIS OF OCCUPATIONAL-SEX GROUPS

Neurotic words	Professional Boys	Professional Girls	Semiskilled Boys	Semiskilled Girls
Noise	25	18	20	29
Sleep	14	17	13	19
Money	35	16	22	29
Falling	32	22	19	34
Lightning	13	13	17	29
Accidents	57	43	38	54
Tiredness	19	17	24	33
Nightmares	44	38	28	54
Work	32	23	12	31
Dogs	29	14	21	32
Temper	39	37	25	51
Business	18	4	14	12
Storms*	36	17	18	53
Darkness	20	14	8	32
Hysterics	20	11	11	23
Gun	28	17	24	35
Crowds	17	10	15	20
Fire	48	41	35	62
Twitching	22	10	14	30
Habits	44	31	32	46
Cats	8	4	11	9
Wrecks	36	25	30	54
Total	636	442	451	751
Average	6.9	5.9	7.3	8.1

*Listed as "windstorms" in Form *A*.

sistently lowest and with the exception of the "suspicious" words, the girls of the semiskilled class rating highest.

On the interests test the girls in each occupational group score higher than the boys, and the girls of semiskilled families rate highest. This tendency for girls from semiskilled families to show the greatest difference between the occupational-sex groups is shown in Figure 3.

A comparison of the Pressey norms with the affectivity scores obtained in this study show the same order for affectivity scores, that is, the highest scores were obtained on the disapprovals test and the lowest on the worries test, as shown in Table 15.

TABLE 15

AVERAGE AFFECTIVITY SCORES AS FOUND IN THREE STUDIES USING THE PRESSEY *X-O* TEST

	Test I Disapprovals		Test II Worries		Test III Interests	
	Boys	Girls	Boys	Girls	Boys	Girls
Present study	76	76	47	37	50	54
Pressey estimated norms	79	75	48	50	58	54
Collins' study*	57	61	63	62	43	46

*The Collins' data were given by age rather than grade. Her scores for age 11 are given here.

The results of the present study and the Pressey norms differ from those of Collins (10), on children in Scotland and England, in which affectivity scores for worries were the highest and interests were the lowest. This difference in response between children in this country and Great Britain is most pronounced in the worries test.

The Pressey norms indicate for this age group a higher affectivity score for boys than for girls on Tests I and III but a higher score for girls on the worries test. In the present study, a higher affectivity score is found for girls only on Test III. This result is unusual as Buck, Chambers, and others have reported that boys rate higher for interests than girls for all age groups tested, which include the seventh grade through the senior college year.

Gorham and Brotemarkle (22) found that college women averaged 1.4 higher on the worries test than men. In the present study boys average 9.8 higher than girls.

3. *Emotional Stability as Rated by Teachers' Estimates*

Much criticism has been attached to the method of ranking children's emotional stability or degree of nervousness by teachers' estimates. Hart and Orlander (25) found that men teachers were more lenient than women in rating personality traits, and that both men and women consistently rated girls significantly higher in traits of sincerity, kindness, honesty, energy, and slightly higher in self-control. Mathews found that teachers' ratings for unstable behavior correlated +.726 with scores for neurotic tendency on the Woodworth-Mathews *Inventory*. The method used by Miss Mathews for teachers' ratings was:

Rating 1, more stable and better poised than average.
Rating 2, average.
Rating 3, nervous and unstable.
Rating 4, psychopathic.

For purposes of this study, the teachers rated the children according to the same scale except that for Rating 4, the term *severe behavior problem* was substituted for "psychopathic."

The scores for emotional stability as found on the Pintner *E* test were correlated with these ratings and found to be slight but negative. These correlations for boys and girls of each occupational group are shown in Table 8.

The average score on the Pintner *E* test was obtained for each of the four behavior ratings and found to be high for boys rated as severe behavior problems, or Rating 4. Pintner reports in the Inventory manual that teachers are often not cognizant of maladjustment in children who are "introverted, submissive, and docile," and that while high scores in these characteristics cannot be regarded as conclusive evidence of poor adjustment still it indicates a need for further observation and study of such cases. Similarly Wickman (48) has shown that teachers rating children for neurotic behavior seem to consider motor activity as an aspect of this characteristic. He believes that:

> The teachers prefer the less active and more compliant behavior of girls to the more aggressive, independent behavior of boys. Desirable conduct for teachers, thus, takes on the distinguishing characteristics of girl behavior. . . . Children who are reported for being frequently or habitually shy and retiring *are regarded by the teachers as free from any of the extravagant* overt types of behavior that are considered serious problems.

In this study, the boys of professional families are rated by the teachers as being more unstable in behavior than the boys of semi-skilled families or the girls of either occupational group (see Table 16). Only 53.4 per cent of boys from the professional class are rated by their teachers in behavior Ranks 1 and 2, while 72.+ per

TABLE 16

Teachers' Estimates of Behavior Rating Compared with Test Scores for Emotional Stability, Ascendance, and Idiosyncrasy

(*A*) Number of children given various behavior ratings by their teachers*					(*B*) Average score on Pintner *E* test			
	Professional		Semiskilled		Professional		Semiskilled	
Behavior rating	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
I. Above average in emotional stability	16	18	19	21				
	17	24	31	22	29.6	28.2	29.0	25.6
II. Average	34	38	27	47				
	36	51	41	51	28.5	28.2	29.1	27.5
III. Nervous and unstable	32	17	11	20				
	35	22	18	21	28.3	27.4	27.2	26.9
IV. Behavior problem	9	1	4	4				
	9	1	6	4	29.5		29.4	24.4
(*C*) Average idiosyncrasy score					(*D*) Average score on Pintner *A-S* test			
I. Above average in emotional stability	14.6	14.0	14.9	13.5	14.7	15.5	15.5	14.9
II. Average	14.4	13.5	14.5	13.7	15.8	15.1	15.5	12.8
III. Nervous and unstable	14.3	13.4	14.9	13.3	17.0	16.5	14.9	14.0
IV. Behavior problem	16.3		15.3	13.3	18.5		16.7	15.0

*Number of cases above to the left; per cent below to the right.

cent of the boys from semiskilled families have this rank, and 75.6 per cent of the girls of professional and 73.4 per cent of the girls of semiskilled families are ranked in these classes. This would seem to indicate that differences in behavior rating are not due to teachers' tendency to rate girls more favorably. The percentage of girls receiving various behavior ranks is about the same but the boys show wide variation.

When scored for idiosyncrasy the behavior problems, Rank 4, among boys show higher idiosyncrasy scores than those in the three other ranks, but this is not the case among girls. Children rated as nervous and unstable do not seem to differ in scores for emotional stability or idiosyncrasy from children rated as average or above average in stability. However, children ranked as behavior problems score considerably higher in the characteristic of dominance than children rated as more stable. Thus it seems that dominance for both boys and girls and "idiosyncrasy" for boys seem to be a criterion for rating as "behavior problems."

C. DIFFERENCES IN SCORES OF CHILDREN WITHIN A SOCIO-ECONOMIC GROUP AS FOUND IN WEALTHIER AND POORER NEIGHBORHOODS

As stated earlier in this study, 31 children of professional families lived in poor economic areas and 21 children of semiskilled families lived in neighborhoods economically superior to the other children of their occupational group. The scores of these 52 children were compared with scores of their occupational group as a whole.

The average *IQ* of children of semiskilled families living in wealthier neighborhoods is three points higher for girls and four points for boys. Children of professional families living in poorer areas average three points lower for both boys and girls than the average of their occupational group. Differences in *IQ* of the various occupations within the professional group living in wealthier and poorer areas are given in Table 17. Children of scientists, and army and navy officers living in poorer areas show no difference in *IQ* from their occupational group living in wealthier areas, but the children of engineers living in poor areas average 8.7 lower than the average for their group. The score for the miscellaneous group living in

TABLE 17

DIFFERENCES IN *IQ* OF CHILDREN OF PROFESSIONAL PARENTS LIVING IN WEALTHIER AND POORER NEIGHBORHOODS

Professions	*N* Living in wealthier neighborhoods	*N* Living in poorer neighborhoods	Total number	Mean *IQ* Wealthier neighborhoods	Mean *IQ* Poorer neighborhoods	Mean *IQ* Total average
Scientists	9	3	12			116.3
Architects	6	2	8	116.0	112.0	115.0
Army and Navy officers	24	3	27			111.5
Physicians	18	1	19			111.0
Engineers	21	6	27	112.3	103.6	110.4
Lawyers	29	0	29			110.0
Miscellaneous	28	16	44	114.1	109.8	112.5

wealthier neighborhoods is due to the very high scores of seven cases, children of reporters, 120.2, and musicians, 117.6.

In personality trait scores, girls of professional families living in poor areas tend to score below the average of their group for extroversion, while girls of semiskilled families living in wealthier areas tend to score above the average of their group for extroversion and emotional stability. Boys of professional families living in poor areas score less for emotional stability than their group average, and boys of both groups living in areas not representative of their occupational status tend to score above their groups for dominance.

On the attitudes tests the only pronounced change in score is found on the disapprovals test. On this test, girls of professional families have an average score of 4.5 points higher than girls of semiskilled families, but score only 3.1 points lower when found in poorer areas while girls of semiskilled families found in better areas have an increase in average score of 17.8. These results seem to indicate that on some of these tests children tend to score similar to other children in their neighborhood rather than according to occupational grouping.

D. DIFFERENCES IN THE RELATION OF SIBLING RANK AND AGGRESSIVENESS AS FOUND IN THE TWO SOCIO-ECONOMIC GROUPS

A great number of studies have been made on the relation of the order of birth and emotional make-up of children. These experiments yield no consistent results and many findings are directly opposite to others. This may be due to faulty sampling, to differences in the tests used, or to the real nature of the effect of order of birth upon the personality of the child. The latter factor may have more significance when we consider the relationship of boys and girls in the sibling constellation; a boy with a number of sisters or a girl with a number of brothers, siblings of the same sex but with considerable difference in age, are all confronted with different situations. In this study no attempt was made to consider these various factors, but an attempt was made to determine whether a difference existed between the two socio-economic groups in the relationship of dominance and order of birth.

The averages on the Pintner *A-S* test were obtained separately for boys and girls in the professional and semiskilled groups according to their classification as only, oldest, intermediate, or youngest children. These differences are given in Table 18 and show that among both boys and girls in the semiskilled group the oldest child is the most dominant, and the "oldest" boys of this group, with an average score of 18.5 rank well above the 75 percentile for boys of the semiskilled group. In this same occupational group, the "only" child rated least dominant for both boys and girls, with the girls of this group averaging below the 25 percentile of girls of semiskilled families. This seems to indicate that the position of "oldest" child has some significance in semiskilled families, possibly due to the general tendency of placing greater responsibilities on oldest children being still more pronounced in families of a lower economic level. Jones (26) is of the opinion that the "only" and "youngest" children may be less dominant than other children because of pampering. The "only child" in this study rates consistently low except for girls of the professional families.

These results are contrary to those of Goodenough and Leahy, who found the "only" child most dominant and the "oldest" child least dominant.

TABLE 18

SIBLING RANK AND SCORES FOR DOMINANCE ON CHILDREN OF TWO SOCIO-ECONOMIC GROUPS

Sibling rank	Boys						Girls					
	Professional			Semiskilled			Professional			Semiskilled		
	Mean	Median	*PE* of mean	Mean	Median	*PE* of mean	Mean	Median	*PE* of mean	Mean	Median	*PE* of mean
Only	15.6	14.1	.638	14.8	15.7	.715	16.0	17.7	.525	10.8	9.5	.729
Oldest	16.2	16.1	.775	18.5	21.5	1.115	15.5	15.1	.569	14.6	14.3	.505
Intermediate	15.9	17.8	.645	15.2	15.2	.515	17.7	17.2	.656	14.3	14.5	.509
Youngest	16.9	17.8	.405	15.1	16.8	.533	13.7	14.5	.604	13.4	12.2	.494

Adler's belief that the position of "youngest" child, especially among girls, induces greater striving to surpass older siblings is not indicated here. Only in boys of professional families is the average score for the "youngest" child above the 50 percentile, and the "youngest" girls of professional families have an average score of 13 which is the 25 percentile point.

The only significant relationship between order of birth and the characteristic of dominance, as found in this study, is in the oldest and only children of the lower income group, with the "oldest" rating most dominant and the "only" rating least dominant. This tendency is found among both boys and girls, and seems to indicate some relation between order of birth and dominance within an occupational group.

V. CONCLUSIONS

This study is concerned with four phases of the relationship between socio-economic groups and the intelligence and emotional make-up of children: (*a*) the relationship between intelligence of children and parental occupation; (*b*) the relationship between personality traits and attitudes of children and parental occupation; (*c*) differences within the occupational groups as found in economically poor and wealthy areas of the city; and (*d*) the effect of sibling rank upon aggressiveness in differing occupational groups.

In general it may be concluded that the results indicate a reliable difference in intelligence and personality traits of children from differing occupational groups with a greater difference being found between girls than boys. The children of professional families average 16.1 in *IQ* above children of semiskilled families, and children from the professional group score higher for the characteristics of dominance, extroversion, and emotional stability. These differences in personality traits of the two occupational groups are largely determined by differences between the girls, with girls of the semiskilled families rating consistently lowest. Among the boys of the two occupational classes there is a reliable difference only in the characteristic of extroversion.

Differences in attitudes tests show a tendency for children of *the semiskilled to have a greater number of worries than children of* the professional group, while tests for disapprovals, interests, and idiosyncrasies show sex differences but small occupational group differences.

Children of professional families living in economically poor neighborhoods have slightly lower intelligence test scores than the average for their occupational group, while the reverse is the case for children of semiskilled families living in wealthier areas. Among children living in areas not representative of their occupational groups there is a tendency for scores on extroversion, emotional stability, and the disapprovals tests to show less resemblance to occupational group scores and a greater resemblance to scores of the occupational group which predominates in the neighborhood. This tendency is more pronounced among girls than boys.

The only significant relationship between order of birth and the characteristic of dominance is found in the "only" and oldest children of semiskilled families with oldest children rating highest and "only" children lowest among both boys and girls.

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A COMPARATIVE STUDY OF MENTAL FUNCTIONING PATTERNS OF PROBLEM AND NON-PROBLEM CHILDREN SEVEN, EIGHT, AND NINE YEARS OF AGE 69
By Myrtle Luneau Pignatelli

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A COMPARATIVE STUDY OF MENTAL FUNCTIONING PATTERNS OF PROBLEM AND NON-PROBLEM CHILDREN, SEVEN, EIGHT, AND NINE YEARS OF AGE*[1]

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I. THE PROBLEM

The following is a report on a comparative study of mental functioning patterns of problem and non-problem children seven, eight, and nine years of age. The 1916 Stanford-Binet Intelligence Test[2] is used as the instrument of measurement. By grouping all subsidiary tests of the Stanford-Binet according to the mental function that is the most active during successful performance in each test, a number of mental categories are obtained. These categories, though they cannot be considered entirely discrete in character, have sufficient individual import to warrant their use in an investigation of mental functioning patterns. Such an investigation has been undertaken in the present study. The objectives of the study are: (*a*) To determine whether problem and non-problem children seven, eight, and nine years of age differ significantly in their mental functioning patterns on the Stanford-Binet. (*b*) To determine whether children seven, eight, and nine years of age who show extremely grave behavior manifestations and children who show behavior manifestations of little consequence, differ significantly in their mental functioning patterns on the Stanford-Binet.

A. SPECIFIC PROBLEMS OF THE STUDY

The study involves three main activities: (*a*) A detailed analysis of the Stanford-Binet as a whole, according to the approaches of Wells, Terman, Burt, and others, and a grouping of the subsidiary tests into categories according to the specific ability each test purports to measure; (*b*) fact-finding, which comprises tabulation and statistical treatment of all data from test and case records; (*c*) comparative treatment and statistical study of data from problem and non-problem groups.

The specific problems of the research are to determine (*a*) the mental functioning patterns of problem and non-problem children seven, eight, and nine years of age when median chronological age and median mental age are held constant, and when mental age is held within a constant range of 7-0 to 9-11, and of problem children seven, eight, and nine years of age with the most serious behavior manifestations and the least serious behavior manifestations, (*b*) and to determine the general behavior picture of the problem group.[3]

---

[2] This test will be termed the Stanford-Binet in the pages that follow.

[3] The criterion for judging seriousness of behavior manifestations is the

B. DEFINITION OF TERMS

The following definitions are given in order to make clear the meaning of the more technical terms used in the study.

1. *Mental Functioning Pattern*

The pattern into which an individual's abilities fall when he is given a standardized intelligence test, such as the Stanford-Binet, in his mental function pattern. Specific functions are derived from an analysis of the scale. Subsidiary tests are grouped into categories according to the mental function that is predominantly active in bringing about a successful test response in each. A graphic representation of mental functioning known as a "psychograph" was made by Rossolimo (44). This device was used in the study of individual cases to portray mental functions in their relation to the mental age of the individual and to that of the norm for the group.

2. *Problem Child*

In this study the problem child is a child (*a*) whose behavior has been sufficiently atypical to lead his parents or teachers to seek aid from a mental-hygiene clinic in understanding and treating him, and (*b*) whose behavior is "problem behavior" according to the clinicians' rating in Wickman's study (67).

3. *Non-Problem Child*

The non-problem child conforms to the following criteria: (*a*) He was not referred for examination by his parents or teachers because of atypical behavior. (*b*) He has not been considered a "behavior problem" by his parents or teachers, and for this reason has not been referred to a mental-hygiene clinic for psychiatric treatment. (*c*) He comes from a non-clinical and non-institutional group and can be considered representative of the rank and file of the school population.

Clinicians' Ratings on the Seriousness of Behavior Problems of Children from *Children's Behavior and Teachers' Attitudes* by E. K. Wickman. Most serious problem children are those whose behavior manifestations are predominantly in the first 25 of the clinicians' list, and the least serious problem children are those with the fewest number of behavior manifestations. The latter are predominantly in the last 25 of the clinicians' list and are considered by these specialists to be of slight or of no consequence in the future adjustment of a child.

4. *A Significant Difference*

Two groups are assumed to show a significant difference in their mental functioning patterns on the Stanford-Binet when they show in like test categories differences in percentages of success that are statistically significant. Garrett's formula (14) for the standard errors of percentages and differences between percentages provides a basis for comparing any two groups. Wherever a plus three sigma difference is obtained, this is, according to Garret, "indicative of a significant difference (virtual certainty) since there is only one chance in 1000 that a difference of $+3\sigma$ will arise when the true difference is zero" (14, p. 213).

5. *Seriousness of Problem Behavior*

Problem behavior is behavior considered in the light of its effect upon the future welfare and happiness of the child. Adopting the classification of Wickman, (67, p. 209), four general divisions are used to indicate the seriousness of atypical behavior. These are: (*a*) behavior that is of no consequence, (*b*) behavior that is of only slight consequence, (*c*) behavior that makes for considerable difficulty, (*d*) behavior that is an extremely grave problem.[4]

C. SCOPE OF THE STUDY

The study includes 606 children, seven, eight, and nine years of age, divided into groups of approximately 200 each. One half of the cases are problem children from the Bellevue Mental Hygiene Clinic (New York City). The other half are non-problem children selected on the basis of the criteria previously cited for non-problem children. Test records of the non-problem group were obtained from the Psycho-educational Clinic of New York University (New York City). The Stanford-Binet examinations were given them by graduate students in psychology for the purpose of gaining proficiency in psychometric technique. These children came from the metropolitan area and were in attendance at school when they were tested. The non-problem children are assumed to be representative of the rank and file of normal children in the population. They live at home, are not attending clinics for psychiatric or psychological treatment, and are not considered behavior problems by their parents or teachers.

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[4] These divisions are taken from the ratings made by the clinicians' group (experts in psychiatry, psychology, and sociology) on seriousness of behavior manifestation in children, reported in the study by Wickman (67).

The problem cases from Bellevue Mental Hygiene Clinic are assumed to be representative of problem children because of the area from which they are drawn and because of the variety of cases which are referred to this clinic by numerous agencies and individuals throughout the metropolitan area.

The study is limited to children seven, eight, and nine years of age. The median chronological ages, median mental ages, and median intelligence quotients of the problem and non-problem groups are statistically comparable. The range of intelligence quotient is not controlled, though the groups are reasonably similar from the standpoint of their distributions.

Test record of non-problem children were tabulated for chronological age, mental age, and intelligence quotient. There were about 100 for each age group. These, by chance, fulfilled the requirements of the study as to median chronological age, median mental age, and median intelligence quotient. Each age group had a median chronological age and mental age equal to the median of their respective year group, and their median intelligence quotients were approximately 100.

The problem cases were selected from the files of the Bellevue Mental Hygiene Clinic to match the non-problem groups in median chronological age, mental age, and intelligence quotient. Problem cases found otherwise suitable were not eliminated because of physical defect or disease.

No effort was made to control sex, color, school placement, or educational attainment for the groups studied. To do so would render the groups less representative of problem and non-problem children in the population as a whole. The control of chronological age and mental age and the choice of representative groups of problem and non-problem children are sufficient to fulfill the requirements of the study.

The basis of differentiation between the problem group and the non-problem group is the fact that the former is or has been under treatment in a mental-hygiene clinic for behavior disorders, and the latter has not been under such treatment. It is assumed that the problem group represents the rank and file of clinic cases of similar age and ability; and that the non-problem group, in like manner, is typical of the rank and file of children, similar in age and ability, who are not clinic cases.

D. SIGNIFICANCE OF THE PROBLEM AND NEED FOR THE STUDY

Intelligence, as the most typical characteristic of the human mind, has always provoked the attention of thoughtful men. The fruitful work of Binet in developing an individual scale for measuring the level of intelligence was an outstanding contribution to psychology. His scale, composed of tests designed to tap a subject's combined intellective capacity, was based on the assumption that intelligence is unitary in character. This asumption underlies and justifies Binet's use of mental age (12, pp. 99-101) as an index of general mental capacity as measured by his scale. Later, Stern (51, p. 80) suggested mental quotient, but it is to Terman (12, p. 101) that credit must be given for the term *"Intelligence Quotient"* or *"IQ"* —an index of a person's mental development in relation to his age.

Extensive practical application of the Binet scale has unfortunately overemphasized the importance of the intelligence quotient while the scale's potential capacity to stimulate a wide variety of mental processes has not been fully appreciated by many who have used it. Terman, and a few others, have been alert to the scale's possibilities. That Terman fully understands Binet's approach to the measurement of intelligence is indicated by the following statement:

> Binet fully appreciated the fact that intelligence is not homogeneous, that it has many aspects, and that no kind of test will display it adequately. He therefore assembled for his intelligence scale, tests of many different types, some of them designed to display differences of memory, others, differences in power to reason, ability to compare, power of comprehension, time orientation, facility in the use of number concepts, power to combine ideas into a meaningful whole, the maturity of apperception, wealth of ideas, knowledge of common objects . . . (53, pp. 42-43).

The varied nature of intelligence has also been implied by Moore (30) when he states that general intelligence is as strong as its weakest link, while Learned and Wood (26) point out the limitations of a single score as an adequate description of the individual. After an extensive study of student abilities, they write:

> The total score frequently used as a single index, although positively significant, is vague and unsatisfactory as a description. It can be replaced today by a series of well-made units that analyze the individual much more exactly and comprehensively with a view to his better education.

Analytical studies of general intelligence backed up by careful statistical treatment of results seem to need no further justification. One of the essential steps in such research would be the choice of an instrument. In the present study the Stanford-Binet is used because its intrinsic organization makes it an adaptable instrument for studying mental functioning patterns. In addition, clinical use of the scale suggests that results from subsidiary tests, when grouped in categories, may have qualitative significance in terms of patterning of ability and mental functioning. It is possible, therefore, that the functional meaning of a test score may be ascertained, if we can determine whether there is any relation between category trends and problem behavior, that is, if a given test pattern that signifies the organization of abilities is in any way related to a child's lack of social adaptation.

In the present study children seven, eight, and nine years of age were chosen because of the significance of these years in terms of the life and developmental span of the individual. These years of childhood represent a critical period when viewed in the light of present and future adjustment. The child is expanding intellectually and socially, and he is facing new experiences daily. His mental capacity to understand and to react to personal experiences largely determines the nature of his adaptation to his environment. These years also lend themselves ideally to accuracy in testing.

Problem children, according to some child specialists, such as Mateer (28), Wickman (67), and others, are below the level of non-problem children in their capacity to coördinate, to adjust, and to integrate in the social sphere. What influence, therefore, does the pattern of intellectual abilities have on this capacity to integrate? Does the possession of high ability in one function influence behavior in some special direction? What developmental differences are there in the mental functions of problem and non-problem children when their median intellectual level is the same? Are there clues to differences in adjustment hidden within the mental functioning patterns of young children?

These are some of the questions which give significance to the problem undertaken in this study. If differences in organization and grouping of abilities in problem and non-problem children can be demonstrated, and hidden intellectual factors of significance can be revealed, such findings may aid in the orientation of child-guidance programs and may contribute to the knowledge of psychological organization in children of these ages.

The present study duplicates some minor aspects of previous investigations, but it does not do so in respect to the organization and treatment of data. In addition, the extension of the method to behavior disorder cases focuses research interest on a group that deserves all the suggestions that scientific inquiry may offer in the way of preventive and educative measures.

II. PREVIOUS WORK AND BACKGROUND OF THE PROBLEM

There are few studies available on the particular problem of this research.[5] A careful perusal of the literature since the time of Binet shows that attention in mental testing has been predominantly focused on the study of quantitative differences in mental make-up. In more recent years, however, with the spread of the mental-hygiene movement, the application of mental tests and psychological techniques has broadened. Many more persons with social and adjustment problems are being studied and treated clinically. This movement has literally pushed the application of psychology beyond the psychometric stage into avenues that give great promise for advancement and growth. Progress in psychology, as in other sciences, does not depend on practice alone, but on the kind of theories that are evolved and how well these theories bear the scrutiny of careful research and statistical treatment.

The résumé of material from the literature on the qualitative application of the Stanford-Binet scale is dealt with under three main headings: (*a*) theories and practices which substantiate the validity of the qualitative approach to the study of intelligence, (*b*) categorical analysis of the Scale by previous writers, and (*c*) application of the qualitative approach to atypical groups and findings of such studies.

A. THE QUALITATIVE APPROACH TO THE STUDY OF INTELLIGENCE

Many who choose the Binet scale as an instrument for research frequently fail to mention the psychology which was an equally important contribution of its author. Binet, always the analytical and practical worker, conducted experimental studies in the psychology of individual differences for many years. He also wrote extensively and, at the same time, sought for the application of psychological principles and techniques in the handling and solution of problems of mental defect and mental unbalance. His scale for the measurement of intelligence is perhaps, to us, the crowning achievement of his psychology.

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[5] In the *Psychological Abstracts* covering a period of 13 years (1927-1939), there was no listing of articles under "mental functioning," though "psychometric patterns" appears a few times.

A comprehensive review of Binet's psychology, recently made by Varon (60), shows that Binet fully recognized the need for qualitative as well as quantitative studies of intelligence. He did not consider measurements made by his scale to be absolute in nature, but maintained that when one seeks to classify and find quantitative differences in persons, qualitative differences are also revealed. The function of mental tests, he pointed out, was to throw light upon the peculiar make-up of the individual, while that of the examiner was to deduce from the results of an examination some general conclusion relative to the habits and functions of the person tested. His attention, as we can readily see, was focused on a psychology "which shows the machine in action" (60, p. 91).

Binet was concerned with the mental organization, the mental development, and the mental measurement of the individual. He held a synthetic theory of the mind, though he admitted there were a host of faculties at work. In his studies of individual differences, he mentioned the following mental functions: perception, judgment of number, ideation, ability to analyze, judgment, sensation, memory, comprehension, and generalization. Binet was particularly interested in the complex processes of the mind and held that measurement, though important, was subordinate to the discovery of qualitative phenomena. He believed that judgment is the essential element in intelligence and that tests of memory, of judgment, and of reasoning serve best to differentiate individuals.

Of Binet's psychology, Varon says:

> The "elements" of direction, comprehension, invention, censorship, dealt primarily with the more complex functionings of the mind—memory, reasoning, judgment. They represented a first attempt to make of intelligence something orderly, to show the manner in which it operates. No earlier attempt gave so concise a description of intelligence as something active and organized.

Peterson (35, p. 97), in a review of an article by Binet and Henri (4), states that they raised the question of the relative importance of the various mental functions and inter-relations of these in the individual. Peterson says:

> Binet and Henri classified the main problems of individual psychology as (1) the study of the extent and the nature of the variations of the psychic processes from one individual to another; and (2) the determination of the inter-relations of these various processes in any single individual as to whether some are fundamental processes upon which all others depend.

Binet maintained that we should distinguish between two aspects of intelligence which are usually confused, namely, maturity of intelligence, which is tested by such problems as definitions, construction of sentences, interpretation of pictures, and arrangements of weights; and rectitude of intelligence, which is shown in the meaningfulness and accuracy of responses and the avoidance of absurdities. He held that experimental work in psychology that had no bearing on questions of efficiency in general behavior was of little value because the mind possesses one essential function to which all others are subordinated, namely, the adjustment to environment for the continuity of the life of the individual. His psychology was dynamic; he conceived of intelligence as the sum total of those thought processes which consist in mental adaptation.

Binet (6) pointed out that each child has its own individuality, and that the mental faculties stimulated by the tests differ and are of unequal development in different children. An additional reason for variability, he observed, is that all tests require an effort of attention, while during a period of concentration attention varies, especially with young children; one moment it is intense, the next moment relaxed.

Terman (53) fully understood Binet's approach to the study of intelligence and his reasons for assembling tests which would measure the higher and more complex mental processes instead of the simpler and more elementary ones. The higher mental functions are more significant and are subject to greater ease of measurement in determining individual differences and in discriminating the normal person from the feebleminded. Binet's point of view, no doubt, exerted great influence on Terman in his work on the Stanford Revision of the Binet scale.

De Sanctis (10), in discussing the mental development and the measurement of the level of intelligence, agrees with Binet's point of view. He says:

> Some mental processes, such as sense perception and imagination, are "immediate" and behave according to the laws of association. Such immediate mental processes . . . . become genuine centers of mental force, when they are animated by voluntary attention . . . . To this class belongs . . . . empirical, associative, or reproductive thought . . . .
>
> Higher mental processes correspond to what was formerly called reflective thought and these we include under the term "higher ideation." . . . . Intelligence is a manifestation of "higher ideation," and consists of further elaboration of the immediate mental processes which characterize lower ideation. Under "higher ideation," we include judgment, the formation of concepts, and reasoning, all involving abstraction and generalization . . . . a complex of representative processes constituting the last stage of mental development; but even in children of eight to ten years of age, this stage is noticeable.

Spearman (49), in his theory of the "two factors," postulates a qualitative division of mental processes into two factors, both of which may be vaguely related to that which De Sanctis calls "higher and lower ideation." The two factors may be thought of as two functions possessing the dynamic quality of a "drive" and the characteristics of complex mental processes. Of the two factors Spearman states:

> The purport of the two factors theory is that the cognitive performances of any person depend upon (*a*) a general factor entering more or less into them all; and (*b*) a specific factor not entering appreciably into any two, so long as these have a quite moderate degree of unlikeness to one another.

Jastrow (20) stresses the individuality of minds and mentions memory as one of the definite functions whose "value lies in its service to organized thinking with and within the total mental make-up," while system gives us the clue to the world of cause and effect.

Piaget (38), in his writings on the development of the higher mental processes states that the child of seven and eight years of age is beginning to form definite habits of observation and social thought. Vague relations gradually become differentiated and there is increasing systematization of the stuff of experience. Judgment and the faculties of generalization are still at a primitive stage of development. The child, being unconscious of his own thought processes, can reason only about isolated cases and "his judgments being juxtaposed are lacking in logical necessity. . . ." His thought still remains largely egocentric, though

> it is from his verbal thought and not as it is presented to him in direct sensation that the child views the world; the verbal plane permeates his whole conception of reality. . . . The social instinct is late in developing. The first critical stage occurs at the age of seven to eight, and it is precisely at this age that we can place the first period of reflection and logical unification as well as the first attempt to avoid contradiction (38, p. 246).

Stern (50) maintains that a child's activity of thought is a striving after the mental conquest of the world; that thought differs from conception in content and process; that it deals not only with concrete contents but refers to objects which lie outside of his experience; and also that thought can be a passing beyond perceptual data.

Moore (31) states that the synthetic sense is the most important factor in general intelligence, and he attempts to analyze this function in relation to the total mental picture. Bentley (3) points out that the most common characteristics of the psychological functions are pattern, clarity, and dominance.

Wallin (61) cautions against oversimplification in the analysis of mental traits from test data and maintains that successful performance in a test depends upon a variety of factors. He says:

> Many psychological tests are customarily referred to as tests of specific mental traits, and the impression is frequently conveyed that mental traits exist side by side as separate and distinct entities. The fact is that the mind is an exceedingly intricate tangle of interdependent and integrated functions, and that it always acts as a totality, a complex unity, and never as a system of isolated and independent capacities. Therefore every psychological test . . . . measures not a single, isolated mental element, but a number of coexistent processes—a mental complex.

Discussion of the qualitative aspects of mental traits dates from the time of the early Greek scholars, but it was not until the work of Binet that experimental mental testing became the tool for the study of mental functions.

Rossolimo (44) was one of the first in our time to undertake in a systematic fashion the detailed analysis of mental traits. He developed a series of tests for isolating by means of examination different mental traits. These were attention, will, perception, memory, comprehension, construction, mechanical sense, imagination, and observation. His tests were never scaled, although he devised a "psychograph" which gave a graphic picture of the subject's total performance. He believed that the profile of a single individual could be studied for its varying qualities, and that the results obtained could be used as a basis for psychological guidance. He used his tests on groups of defective, lazy, retarded, and inattentive children and found qualitative differences.

Humpstone (19) made an analysis of the subsidiary tests of the Stanford-Binet scale according to the category each measures. These were memory span, memory, discrimination, imagination, comprehension, and motive. He called them "competencies" and said they could be analyzed out of the tests by a trained psychologist. On the basis of his analysis he concluded that "the meaning of the Binet score is a performance level on the intellectual scale" (19, p. 26).

Washburne (64), in an effort to establish a basis for diagnostic *classification, grouped the subsidiary tests of the Stanford-Binet* in groups according to their most significant functions. He called it the "classified scale" and claimed it would give a practical diagnosis of a subject's weak and strong points. He was, apparently, the first to use the term "function age" to denote the level of a person's performance in a specific category or test.

Moore (30) made an analysis of general intelligence according to functions or abilities and attempted to show diagrammatically the quantitative and qualitative aspects of each component. Porteus (41), in an analysis of the Stanford-Binet scale, says that over 70 per cent of the tests require an oral response, 50 per cent test language development, 31 per cent are dependent on previous educational training, and that memory, practical ability, motor response and arithmetic ability are also tapped by the scale.

Shalet (46) made a study of the responses of a group of normal children on the Stanford-Binet scale and found that ratings are often influenced by the presence of special abilities, and that responses to subsidiary tests must be studied for clues to mental ability that *are not revealed by the mental age and intelligence quotient.* She made an analysis of the Stanford-Binet subsidiary tests according to functions tested, and recommended the use of analysis in the study of individual differences and for the interpretation of mental-test findings.

Poul (42), recognizing the value of the analytical and psychographic approach to the study of mental functioning in the individual clinic case, devised two types of psychographic records. In addition to the Stanford-Binet, she makes use of a variety of other tests, as she believes that by so doing a picture of the individual can be obtained that is freed of some of the limitations of the intelligence quotient. She says: "The mental age and *IQ* are averages and have all the limitations of averages. Not only do individuals of identical mental age and *IQ* vary in their emotional, environmental, and physical traits but they vary in their mental constitution" (42, p. 163).

Burt (8) recognizes the relative value of the subsidiary tests of the Stanford-Binet in their capacity to tap varied mental abilities and function. Kato (22), in an experimental study of "The Ball and Field Test" of the Stanford-Binet, points out the value of the abstract and concrete aspects of this test in stimulating intellectual and instinctive characteristics in behavior.

More recently factor analysis has been developed as a method of investigating the nature and organization of mental abilities or functions. Garrett (13) states that factor analysis has proved its usefulness as a psychological method. Wright (69) made a factor analysis of the Stanford-Binet responses of a group of 10-year-old children and identified six factors which she believed to be primary in nature. Thurstone (58), in discussing mental categories and factor analysis, says: "The results point to the conclusion that mind is not a structureless mass, but that it is structured into constellations or grouping of processes that can be identified as distinct functions in the test performance."

The foregoing viewpoints may be summarized as follows:

1. Psychologists, since Binet, have recognized the validity of the quantitative and qualitative approaches to the study of intelligence.

2. Binet tests, especially the Stanford-Binet, have been widely used in experimental studies, and results, after being subjected to quantitative and qualitative analyses, have shown the value of a dual approach in the study of individual differences in intelligence.

3. A few writers caution against oversimplification in the analysis of mental traits from test data, and all of them agree that although intelligence may be composed of a wide variety of mental functions it is an integrated complex.

4. The recent work in factor analysis purports to identify distinct functions in test performance through the use of highly involved statistical treatment of test data.

B. CATEGORICAL ANALYSIS OF THE 1916 STANFORD-BINET BY PREVIOUS WRITERS

The 1916 Stanford-Binet Intelligence Test has undergone considerable analysis since its inception. Early users of the test soon realized that a variety of mental functions were called into play during an examination. They were curious to know what functional meaning the subsidiary tests had. Although these were initially designed to measure a unitary intelligence which could be expressed as a level in terms of mental growth, their use soon demonstrated that recognizable categories, though interrelated, arise as components of general intelligence during an examination.

Instances in the literature of writers who have analyzed the categories measured by the Stanford-Binet examination method have been investigated, in order to determine a basis for grouping the Stanford-Binet subsidiary tests into categories for the present study. The works of Binet, Terman, Humpstone, Washburne, Porteus, Richmond (43), Wells (65), Shalet, Burt, Collins and others (9), and Wright seem most pertinent for the purposes of the present study. These writers, excepting Binet, made analyses of the 1916 Stanford-Binet. The categories they give differ considerably, and in some instances apparently similar ones have been called by different names. In order to classify the categories given by the various authors, their material has been grouped under 11 general headings. These category headings, together with the author and date, appear in Table 1.

As may be noted in Table 1, the authors vary widely in the number of categories that they give. There is no general opinion among them as to what functions or abilities the subsidiary tests of the Stanford-Binet scale measure. One author notes as many as 34 and another as few as six.

TABLE 1

CATEGORIES FORMED BY GROUPING SUBSIDIARY TESTS OF THE 1916 STANFORD-BINET

Categories	Authors and year										
	Terman 1916	Humpstone 1919	Washburne 1919	Porteus 1922	Richmond 1927	Wells 1927	Shalet 1932	Burt 1935	Collins, et al. 1938	Wright 1939	Total
Comprehension	X	X	X	X	X	X	X		X		8
Reasoning	X				X	X		X	X	X	6
Ability to Analyze	X		X								2
Logical Element	X							X			2
Generalization	X		X					X			3
Discrimination	X	X			X						3
Comparisons	X		X			X					3
Differences	X						X	X	X		4
Similarities	X						X		X		3
Induction										X	1
Memory	X	X	X	X	X	X			X		7
Memory Span	X	X	X	X			X				5
Judgment											
Practical	X					X					2
Ideational	X					X					2
Inventiveness			X					X			2
Ingenuity	X		X								2
Imagination	X	X	X		X						4
Fertility of Association	X		X		X			X			4
Language	X			X							2
Vocabulary	X		X	X	X	X	X		X		7
Verbal Relations	X									X	2
Defining Power			X	X				X			3
Common Knowledge			X					X			2
Names of Things and Objects	X							X			2
Of Time	X						X	X			3
Information	X							X			2
Number Concept	X		X	X			X		X	X	6
Using and Manipulating Numbers	X		X					X			3
Arithmetic Ability	X		X	X			X		X		5

TABLE 1 (Continued)

Categories	Terman 1916	Humpstone 1919	Washburne 1919	Porteus 1922	Richmond 1927	Wells 1927	Shalet 1932	Burt 1953	Collins, et al. 1938	Wright 1939	Total
Imagery	X				X	X			X	X	5
Practical or Non-Verbal Abilities	X			X				X			3
Sensation	X					X					2
Motor Response and Co-ordination		X	X	X							3
Speed of Response	X					X					2
Patience			X								1
Perception of Space			X			X		X			3
Perception of Geometric Forms	X					X	X	X		X	5
Discrimination of Forms	X		X								2
Miscellaneous											
Maturity of Apperception	X										1
Following a Guiding Idea	X						X	X			3
Motive		X									1
Special Training			X	X				X			3
Number of categories	33	7	22	11	8	12	10	17	9	6	

Note: The table may be read as follows: The categories mentioned by the authors appear at the right of the page and are read from right to left across the page; the totals at the end of the line indicate how many authors mentioned a specific category. The author's name with the date of his publication appear at the top; to find the categories mentioned by a specific author, follow the marks down the page which appear under his name. The number for each author is indicated by the totals appearing in the last line of the table.

Terman (53) makes a greatly detailed analysis of each subsidiary test of the scale according to the psychological function which is purported to be brought into play during an examination. The functions mentioned are those usually associated with the higher mental processes such as comprehension, judgment, and reasoning, and the more general functions such as attention, alertness to environment, memory, imagination, and language.

Thurstone (57), using the more objective technique of factor analysis for psychological tests of all types, has identified the following mental abilities: number facility, word fluency, visualizing, memory, perceptual speed, induction, and verbal reasoning. In a recent study, Kendig and Richmond (23) used the Stanford-Binet scale in an investigation of dementia praecox patients. They classified the subsidiary tests of the scale according to whether a test demanded a large or small amount of *"G"* for successful performance. Their groupings were subjective; the exact dependency upon *"G"* of each test in the Binet, in the Spearman (48) sense, has never been worked out, though Kendig and Richmond's findings, based on a dual category, were discriminative to a degree for their experimental groups.

C. COMPARATIVE STUDIES IN MENTAL FUNCTIONING ON THE STANFORD-BINET RELATED TESTS

Comparative studies of test performance from normal and atypical persons may bring into relief the fact of variation in the organization and efficiency of mental functions. A résumé of selected studies follows.

The significance of "scatter"[a] on the Binet scale, although widely discussed by psychologists, has no clear-cut and simple explanation. Binet (5) attributed scatter in children to developmental factors and maintained that the feebleminded scatter more than normal children. Doll (11), Shipley (47), and others agree with this point of view, while Wallin (62) holds that normals scatter more. Harris and Shakow (18), in a recent review of the literature on the subject, state that results from studies are somewhat contradictory, but all agree that "scatter" occurs and is apt to be more marked in the test performance of adults with abnormal mental conditions than in children. Wells (65, p. 60) commenting on the clinical significance of "scatter" says, "Scatter is a minor symptom only and must be taken in reference to other facts in the case." Mateer (28), on the other hand, believes that the range and the type of tests failed or passed are of diagnostic significance in clinical cases.

Irregularity on the Stanford-Binet, however, tends to give, when the results are analyzed, a discernible pattern of mental functions.

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[a] "Scatter" or irregularity in a test is the tendency for a subject to pass *some tests and fail others (within his test range) before the upper limit of* his ability is reached.

Rossolimo (44), in his experiments, applied the concept of mental functioning pattern in the differential study of his clinical groups. Anderson (1), after a study of a number of test records, found that irregularity in tests was in many cases related to some special defect of auditory word memory, visual imagery, and other functions. He pointed out that these defects frequently occur in children of otherwise normal intelligence, that it was very important to determine these cases at an early age, and to give them special educative treatment apart from the feebleminded. Phillips (36), in an analytical study of the Binet-Simon test responses of third-, fifth-, and sixth-grade school children, some of whom were retarded and some accelerated in school work, found that the groups varied to some extent, but some of the subsidiary tests were consistently more difficult for the more retarded children.

Stokes (52) obtained the test data on 140 children, from the Harvard Growth Study, who were selected as representative of the general population for their ages. She found that the subsidiary tests at the eight- and nine-year levels of the Stanford-Binet are of unequal difficulty. Wallin (63) made a study of the responses to the eight- and nine-year subsidiary tests of the Stanford-Binet obtained from 1,382 children composed of normals, sub-normals, and the feebleminded. He found that if the test age was used as a criterion, only two tests at the eight-year level failed to discriminate the three groups.

Shalet (46) made a statistical study according to mental age of the responses of a group of normal children to the individual tests of the Stanford-Binet. She found that (*a*) the subsidiary tests were of unequal difficulty, and (*b*) if the tests were classified into categories and a careful analysis of success and failure were made, the differences between children of similar mental levels but of dissimilar special abilities would be revealed. Jones (21), in a study of the pattern of abilities in juvenile and adult delinquents on the subsidiary tests of the Stanford-Binet with mental age held constant, found that groups similar in mental age or opportunity to learn may present marked differences in the pattern of subsidiary-test performance on the Stanford-Binet.

Investigators using the Stanford-Binet on psychiatric patients emphasize the use of tests as measures of mental functioning. Schott

(45) retested an equal number of adults and children who were neuropsychiatric cases and found no relation between variability and intelligence quotient on retest. She concludes that a retest should be considered a barometer to indicate the upward and downward trend of mental functioning. Layman (25) compared the performance of 900 mentally ill patients with that of normal subjects on the short form of the Stanford-Binet using Thurstone's factor analysis technique. He found that deviations from the normal performance appear, which are common to all the psychoses studied, and are also characteristic of peculiar syndromes.

Glanville (15) made a study of the verbal and performance abilities of a group of delinquent boys and found that their language development was below the level of their intelligence. He says: "Language retardation as one of the important causes of delinquency is suggested as being of significance in this study." Bühler (7), after studying the performance of 165 children in the ball and field test of the Stanford-Binet, found evidence to indicate that this test could be considered symptomatic and diagnostic of emotional problems in children. Piotrowski (40), in a comparative study of the Stanford-Binet profiles of psychotic and non-psychotic individuals, found significant differences between the two groups.

Babcock (2) developed a series of tests for the measurement of deterioration and expressed results in terms of an efficiency index. She studied dementia praecox patients with this technique and found that they showed progressive loss of efficiency as the disease advanced. Her experimental group was slow in free association, defective in learning, and highest in the ability to give definitions and to see abstractions. The efficiency index for the patient group was definitely lower than that for her normal control group.

Kendig and Richmond (23), in a study of 500 dementia praecox patients, conclude that the mind of the praecox is blunted and dull. They say:

> This intellectual inferiority is not primarily due either to deterioration or to temporary impairment resulting from the psychosis, since it shows itself in extensive school failure long before the actual breakdown and, in most cases, before the occurrence of the first premonitory symptoms of the disease. While in some instances it may be congenital, our case histories suggest that more often it is the product of the emotional

> maladjustment which later plays an important etiological role in the precipitation of the psychosis.

In the same study Kendig and Richmond (23, p. 73) compared the dementia praecox patients with a normal control group, composed of nurses and employees, as to pattern of mental functioning on the Stanford-Binet. Mental age was held constant. They concluded that "besides a generalized impairment in test performance, the pattern of responses which distinguishes the dementia praecox from 'normal' groups is characterized by marked failure in tests requiring the exercise of close attention and effort." Peatman from a different angle, in commenting on the functional meaning of a test score, says, ". . . the basic method of discovering such a meaning is one of determining whether there is any relation between test scores and behavior criteria independently arrived at. . . ." (34).

A summary of the findings of these investigators follows:

1. "Scatter" in test performance is of uncertain significance; it may be a minor symptom, in some cases, and must therefore be interpreted in the light of total case findings.
2. Irregularity on the Stanford-Binet test gives the performance a discernible pattern; it tends to be more frequent in feebleminded delinquents and in clinical groups, or it may appear in otherwise normal children, as a result of some special defect.
3. Tests of the Stanford-Binet, especially at years eight and nine, may be of unequal difficulty for different groups. Age, mental age, and social behavior may account for differences not otherwise expected on test performance.
4. Retest on neuropsychiatric cases may indicate an upward or downward trend of mental functioning, and more deviation can be expected in abnormal persons. Significant differences have been found between normal and psychotic groups on the tests of the Stanford-Binet.
5. Certain subsidiary tests of the Stanford-Binet may have diagnostic significance from a clinical and psychiatric point of view.
6. The value of test techniques to determine impairment in mental functioning of dementia praecox patients has been demonstrated.
7. The functional meaning of a test score can be ascertained only in the light of total behavior criteria and of total mental functioning.

III. PROCEDURE IN COLLECTING AND ORGANIZING THE DATA

The children making up the problem and non-problem groups conformed to the requirements for problem and non-problem children as outlined in Chapter I. There were 303 children in each group, all of whom came from the metropolitan area and, in most instances, were in attendance at public schools at the time of their examination. Children of both groups were given the Stanford-Binet. The non-problem cases were examined in their respective schools by graduate students of psychology at New York University. The problem cases were registered at the Bellevue Mental Hygiene Clinic and were examined by members of the psychological staff of that institution. The clinic operates as a free city clinic and draws its patients from the middle and the lower economic and social strata of the community. The non-problem children came from all economic and social strata of the metropolitan area.

The problem and non-problem groups were paired with each corresponding age group on the basis of median chronological age, median mental age, and median intelligence quotient. Data on sex for each group were obtained, and data as to color were available for the problem group, though neither factor has been controlled in the study.

The case histories of the problem group were carefully inspected. The psychiatric diagnosis and data on physical and educational defects were available. All case histories were obtained by the psychiatrists (who were treating the individual cases) by means of interviews with parents, teachers, social workers, and from clinical observations of the individual children. (The reports as a whole, are believed to give a reliable index of the behavior manifestations of each problem child). In order to facilitate the tabulating of the extensive data, a code sheet was set up to include personal data, the Binet performance, Wickman's behavior list (67), and the following additional items: runs away from home, plays with fire, learning problems, speech defects, and physical defects and diseases.

A. GROUPING THE SUBSIDIARY TESTS OF THE 1916 STANFORD-BINET INTO CATEGORIES

After careful study of the 1916 Stanford-Binet analyses and groupings cited in Chapter II (a summary of which appears in tabular form in Table 1), the subsidiary tests of the Stanford-Binet scale were combined into logical and homogeneous groups according to the mental function thought to be required in the performance of each test. The opinions of experts were drawn upon for criticism and approval of the categories selected. These were the following:

1. *Languae*

The vocabulary test at all levels.
The definition test at years five, eight, and twelve.

2. *Comprehension*

The social comprehension questions at years four, six, eight, and ten.
The picture test at years three, seven, and twelve.

3. *Invention and Reasoning*

The rhymes and sentences at year nine.
Naming sixty words at year ten.
Mixed sentences at year twelve.
Arithmetic problems at years nine and fourteen.
Induction test at year fourteen.
Ingenuity problems at year eighteen.

4. *Comparison and Judgment*

Line discrimination at year four.
Weights at year five and nine.
Aesthetic comparison at year five.
Mutilated pictures at year six.
Differences at years seven, fourteen, and sixteen.
Similarities at years eight and twelve.
Fables at years twelve and sixteen.
Ball and field test at years eight and twelve.
Absurdities at year ten.
Problems of fact at year fourteen.

5. *Imagery*

Clock problems at year fourteen.
Enclosed boxes and code test at year sixteen.
Paper cutting test at year eighteen.

6. *Information, General and Personal*

Giving last name, naming parts of body, and naming objects at year three.
Color naming at year five.
Distinguishing right and left, and naming coins at year six.

Giving number of fingers at year seven.
Giving the date at year nine.

7. *Memory*

The commands test at year five.
Repetition of digits forwards and backwards at all levels (alternate tests excluded).
Repeating syllables at years three and six.
The designs test at year ten.
The reading selections at years ten and eighteen.

8. *Perception and Coördination*

Copying square and diamond at years four and seven respectively.
Form discrimination at year four.
The patience test at year five.
Tying a bow knot at year seven.

9. *Number Relations*

Counting pennies at years four and six.
Counting backwards 20 to 1 at year eight.

In selecting tests for grouping under the various categories, the major mental process thought to be required in the performance of each test was the determining factor. It is admitted, however, that some of the tests may elicit more than one mental activity.

B. TABULATION OF THE DATA[7]

The steps in the organization of the raw data were as follows:

1. Distributions of chronological ages, mental ages, and intelligence quotients were made, keeping the groups separate.

2. The successes on all subsidiary tests of the Stanford-Binet were tabulated. The problem and non-problem groups and each age group were kept separate.

3. The Stanford-Binet records of children whose mental ages fell within the range of seven years to nine years and eleven months were selected from both the problem and the non-problem groups. The groups were kept separate and these records were tabulated according to mental-age groups, i.e., all those within the seven-year mental-age group were those whose mental ages fell within the range of seven years and eleven months inclusive, the same holding true for the eight- and nine-year mental-age groups. (The chron-

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[7] Because of the extensive nature of the data double checking was done at frequent intervals; all computations were double checked.

ological age factor was not taken into account in the selection of these groups, except that the range was the same as that for the main research group as a whole, namely, seven years to nine years and eleven months.)

4. Fifty records (Stanford-Binet and behavior records) from each age level of the problem groups were selected, 25 records of children with the greatest number of serious behavior manifestations, and 25 records of children who had the least number of less serious behavior manifestations as determined by Wickman's (67) clinicians' ratings. This material was tabulated according to age group.

5. The psychiatric diagnoses of the problem children were tabulated in detail according to age.

C. STATISTICAL TREATMENT OF THE DATA

In order to elicit the salient characteristics of the groups studied, and to establish a basis for purpose of description and comparison in terms of statistical language, the following computations were made:

1. Medians were computed for chronological ages, mental ages, and intelligence quotients for each group and each age division.

2. Percentages of success in each subsidiary test and in each mental category were computed for all groups according to age and mental-age divisions and for the most and least serious problem cases.

3. The percentages of occurrence of behavior manifestations were computed for each age and mental age division of the problem group and for the most and least serious problem cases.

4. Standard errors of the percentages of success in the categories were computed for each age and mental-age division of the problem and normal groups and for the total groups of most and least serious problem cases.

The following formula from Garrett (14, pp. 227-228) was used to compute the standard error of a percentage in which p is the percentage of times success on a category occurs, q is equal to 1 minus p, and N is the number of cases:

$$\sigma_p = \sqrt{\frac{pq}{N}}. \qquad (45)$$

5. Standard errors of the differences of percentages were computed for all categories for each age and mental-age division of all groups compared and for the most and least serious problem cases. The following formula from Garrett (14, p. 228) was used to compute the standard error of the difference between two uncorrelated percentages in which p_1 is the problem group and p_2 is the non-problem group:

$$\sigma_{D_p} = \sigma_{p_1 - p_2} = \sqrt{\sigma^2_{p_1} + \sigma^2_{p_2}} \qquad (46)$$

The reliability of a percentage shown by a group on a category is measured by its standard error. The standard error of a percentage indicates to what extent a group diverges from the "true" percentage of the population from which the sample is drawn. In the present study the groups were selected randomly and are believed to be "typical" of the population from which they came. Assuming this, the chances are 68 in 100 that the "true" percentage will lie within the limits of plus and minus one standard error. It is reasonably certain that the "true" percentage does lie within the limits of plus and minus three standard errors. The size of a standard error depends upon the size of the percentage and upon the number of cases in a group. Standard errors are expressed in terms of per cent; a small standard error indicates a small amount of probable divergence from the "true" percentage, and, the percentage is consequently more reliable.

The standard error of the difference between the percentages of two groups on a category indicates the reliability of the difference between the two groups and whether or not a significant difference between them is present. A difference of plus three standard errors of the difference is considered significant, since there is only 1 chance in 1000 that a difference as large as this will arise when the true difference is zero. The differences in percentages on a category and the size of the standard errors of the percentages for the groups compared determine the size of the standard errors of the difference.

The findings of the study, with interpretations, are presented in Chapter IV.

IV. THE RESULTS OF THE STUDY

In the present chapter the results of the study are given. The characteristics of the problem and normal groups as to age and intelligence are considered in detail. Proportion of males to females is given for the normal group; sex and color for the problem goup. The findings on the problem children with respect to behavior manifestations and psychiatric diagnoses are discussed fully. Test results are grouped and classified for statistical comparison. The findings are presented in tabular and descriptive form. Many of the raw data are necessarily omitted because of their extensive and detailed nature.

A. AGE AND MENTAL ABILITY OF THE GROUPS STUDIED

The median chronological ages, mental ages, and intelligence quotients for the problem and normal groups, according to age division, are summarized in Table 2.

1. *Problem and Normal Groups*

The range of chronological age is comparable for the age divisions of both problem and normal groups, namely, 7-0 to 9-11. The cases are fairly well distributed throughout the month range for each age level. The seven-year problem group has a median chronological age of 7-6,[8] and the normal has a median of 7-5. Both the eight-year problem and normal groups have median chronological ages of 8-5; the nine-year problem group has a median chronological age of 9-5, and the normals a median of 9-6. The groups of each age division are very similar in median chronological ages and are therefore comparable in age from a statistical standpoint.

The groups are also comparable with respect to median mental ages. The seven-year problem and normal groups have median mental ages of 7-4 and 7-8 respectively; the eight-year groups have medians of 8-7 and 8-11; the nine-year groups have identical median mental ages of 9-5. The range of mental ages is wider in the case of the normal groups. All distributions, however, showed a tendency for the cases to cluster in the vicinity of their respective medians.

The median intelligence quotients of the seven-year problem and

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[8] 7-6 designates a chronological age or mental age of seven years and six months.

TABLE 2

DISTRIBUTION OF MEDIAN CHRONOLOGICAL AGES, MENTAL AGES AND INTELLIGENCE QUOTIENTS

(*a*) Total Problem and Normal Groups; (*b*) Problem and Normal Groups, Mental Age 7-0 to 9-11, Inclusive.

(*a*)

Age Groups	No. of cases	Range *CA*	Range *MA*	Range *IQ*	Median *CA*	Median *MA*	Median *IQ*
7 Yr. Prob.	97	7-0 to 7-11	4-2 to 10-4	54 to 138	7-6	7-4	97
7 Yr. Norm.	105	7-0 to 7-11	3-0 to 10-11	40 to 143	7-5	7-8	102
8 Yr. Prob.	105	8-0 to 8-11	5-4 to 11-4	62 to 136	8-5	8-7	102
8 Yr. Norm.	94	8-0 to 8-11	5-4 to 13-4	60 to 161	8-5	8-11	106
9 Yr. Prob.	101	9-0 to 9-11	5-4 to 12-4	58 to 135	9-5	9-5	100
9 Yr. Norm.	104	9-0 to 9-11	6-0 to 15-10	67 to 162	9-6	9-5	99
Total							
Prob. Groups	303	7-0 to 9-11	4-2 to 13-4	54 to 138	8-6	8-5	100
Norm. Groups	303	7-0 to 9-11	3-0 to 15-10	40 to 162	8-6	8-8	103

(*b*)

MA Groups	No.	Range *MA*	Range *CA*	Range *IQ*	Median *CA*	Median *MA*	Median *IQ*
Prob.	74	7-0 to 7-11	7-0 to 9-9	74 to 108	7-9	7-6	96
Norm.	50	7-0 to 7-11	7-0 to 9-9	72 to 110	7-7	7-4	91
Prob.	79	8-0 to 8-11	7-0 to 9-9	84 to 118	8-5	8-5	99
Norm.	76	8-0 to 8-11	7-0 to 9-11	85 to 118	8-5	8-5	101
Prob.	66	9-0 to 9-11	7-0 to 9-11	95 to 131	9-0	9-4	105
Norm.	60	9-0 to 9-11	7-0 to 9-11	90 to 136	9-0	9-6	102
Total							
Prob.	219	7-0 to 9-11	7-0 to 9-11	74 to 131	8-2	8-5	101
Norm.	186	7-0 to 9-11	7-0 to 9-11	72 to 136	8-3	8-6	101

normal groups are 97 and 102. This difference of five points is within the limits of the probable error of testing; hence these groups are sufficiently similar in mental make-up for purposes of comparison. The eight-year problem and normal groups have median intelligence quotients of 102 and 106 respectively, and the nine-year groups have medians of 100 and 99 respectively. In the normal groups the range of intelligence quotients is wider and there are more cases in this group with higher intelligence than in the problem groups. Distributions of both groups show a tendency for cases to cluster around the median.

When the three age divisions are totaled, the problem and normal cases have a median chronological age of 8-6, median mental ages of 8-5 and 8-8 respectively, and median intelligence quotients of 100 and 103 respectively. The range of mental ages and intelligence is greater for the total normal group. The distributions of both groups have approximately an equal number of cases in the lower mental age range. The normal group has more cases in the upper levels. The groups resemble each other with respect to total number of cases, median mental make-up, and age; for the purposes of the study, they are comparable. Differences in number of cases for each group tend to balance one another and thus, do not influence the results of the study to any appreciable extent.

2. *Problem and Normal Cases with Mental Ages 7-0 to 9-11, Inclusive*

All the cases in the problem and normal groups who had mental ages between 7-0 and 9-11 were selected for special study, thus permitting a restriction of the mental age range to that of the chronological age range. This was done in order to determine what influence a constant mental-age range would have on the mental functioning patterns of the two groups studied. There were 219 problem children and 186 non-problem children in the total groups whose mental ages fell within a range of 7-0 to 9-11. The findings with respect to median chronological age, mental age, and intelligence quotient appear in summary form in Table 2. It may be noted that in addition to similarity of chronological-age and mental-age range, the intelligence-quotient ranges vary moderately (13 points). The groups are thus comparable for the purposes of the study.

3. *Problem Cases with Most and Least Serious Behavior Manifestations*

The findings for the most and least serious problem cases with respect to median chronological age, mental age, and intelligence quotient appear in Table 3.

TABLE 3

MEDIAN CHRONOLOGICAL AGE, MENTAL AGE, AND INTELLIGENCE QUOTIENTS OF THE MOST AND LEAST SERIOUS PROBLEM CASES

Group	No.	Range *CA*	Range *MA*	Range *IQ*	Median *CA*	Median *MA*	Median *IQ*
Most	75	7-0 to 9-11	5-4 to 11-5	62 to 138	8-2	8-5	101
Least	75	7-0 to 9-11	5-5 to 11-8	59 to 130	8-5	8-6	102

The most serious problem cases have medians as follows: chronological age 8-2, mental age 8-5, intelligence quotient 101. The medians for the least serious problem cases are—chronological age 8-5, mental age 8-6, and intelligence quotient 102. In these respects the groups are surprisingly similar in light of the basis on which they were selected, namely, degree of seriousness of behavior manifestations.

B. SEX AND COLOR IN THE GROUPS STUDIED

The sex of all the children studied was obtained; color was available only for the problem cases.

The number of boys and girls in the normal groups appears in Table 4. There are about 5 per cent more boys than girls in the total normal group, and the same holds true for the group with mental ages 7-0 to 9-11. The percentage of boys and girls in each age division varies—the greatest difference being in the 8-0 to 8-11 mental-age

TABLE 4

DISTRIBUTION OF SEXES FOR THE TOTAL NORMAL GROUPS

	CA 7-0 to 9-11 No. at each age level				*MA* 7-0 to 9-11 No. at each *MA* level			
Sex	7*	8	9	Total	7*	8	9	Total
Boys	48	51	61	160	25	45	28	98
Girls	57	43	43	143	25	31	32	88
Number	105	94	104	303	50	76	60	186

*Indicates *CA* or *MA* of 7-0 to 7-11.

groups. There were 19 per cent more boys than girls in this mental-age group.

The proportion of the sexes according to color for the total problem group and for the problem cases with mental ages 7-0 to 9-11 are presented in Table 5. Only slight variations from the proportions in the total problem group occur when mental-age range alone is the basis for selection of the cases.

TABLE 5

SEX AND COLOR OF THE TOTAL PROBLEM GROUP AND THE CASES WITH MENTAL AGE 7-0 TO 9-11, INCLUSIVE

Sex and Color	Number of each							
	Range *CA* 7-0 to 9-11 No. of Cases at Each Year Level				Range *MA* 7-0 to 9-11 No. of Cases at Each *MA* Level			
	7	8	9	Total	7	8	9	Total
White								
Boys	46	55	46	147	30	43	30	103
Girls	18	19	21	58	15	14	17	46
Total	64	74	67	205	45	57	47	149
Negro								
Boys	22	28	24	74	23	14	16	53
Girls	11	3	10	24	6	8	3	17
Total	33	31	34	98	29	22	19	70
Number	97	105	101	303	74	79	66	219

In the total problem group the white children exceed the negro by over 30 per cent, and the boys, regardless of color, exceed the girls by more than 42 per cent. The proportion of white boys to white girls is more than two to one; the negro boys to negro girls, three to one. In the total problem and mental-age groups, the proportion of white to negro children is about four to one. The boys outnumber the girls nearly three to one. The percentage of negro children in the problem groups is greatly in excess of expectation, in the light of their proportion (less than 10 per cent) in the total child population of New York City. The relatively lower percentage of negro girls in the group, and the tendency for their number to decrease with age, is an interesting finding. The proportion of white children in the total problem group is about the same for each of the three age divisions.

The sex and color of the most and least serious problem cases are presented in Table 6. The boys, regardless of color, exceed the girls by 60 per cent in the most serious total problem group; the white children exceed the negro by approximately 33 per cent. The proportion of negro boys to negro girls with serious problem behavior is about five to one. In the least serious group the sexes tend to be more equally distributed, although the boys also exceed the girls among these cases. In the total problem group (303 children), 25 per cent of the cases are serious behavior problems and a like number have mild behavior problems; among those having serious problems, 20 per cent are boys and 5 per cent are girls; the percentage of girls with mild problems runs higher.

TABLE 6

SEX AND COLOR OF THE MOST AND LEAST SERIOUS PROBLEM CASES

Seriousness of behavior	No.		White			Negro	
		Boys	Girls	Total	Boys	Girls	Total
Most	75	41	11	52	19	4	23
Least	75	32	21	53	14	8	22
Number	150	73	32	105	33	12	45

In the normal groups, the boys exceed the girls by 5 per cent, and in the problem group by 45 per cent. Since males exceed females in the population of the country as a whole by less than 3 per cent, the greater preponderance of male children in the problem groups is a *finding of definite sociological significance.* These findings are in agreement with those of a study of problem children by Martens and Russ (27), who found males exceeding the females by 54 per cent. The large proportion of negro children, especially boys, who are problem children is another significant finding of the study.

C. BEHAVIOR MANIFESTATIONS AND ASSOCIATED CONDITIONS OF THE PROBLEM GROUP

The percentages of occurrence of behavior manifestations and associated conditions in the problem groups appear in Table 7. Five items, because of their importance, were added to Wickman's list, viz., learning problems, speech defects, disease, running away from home, and playing with fire. Those items that occur most frequently in the age divisions, the mental age divisions, and in the most and least seri-

TABLE 7

Percentage of Occurrence of Behavior Manifestations and Associated Conditions in the Selected Problem Groups; Chronological Age 7-0 to 9-11, Inclusive

Behavior manfestation or condition	Total problem group %	Problem group *MA* 7-0 to 9-11 %	Serious problem cases	
			Most %	Least %
Unsocial, withdrawing	13.5	13.2	29.3	0.
Suspiciousness	1.3	2.3	8.0	0.
Unhappy, depressed	5.9	5.0	14.7	0.
Resentfulness	15.8	17.8	40.0	2.7
Fearfulness	19.8	18.3	42.7	4.0
Cruelty, bullying	13.5	15.5	40.0	1.3
Easily discouraged	.9	0.9	1.3	0.
Suggestible	5.9	4.1	13.3	0.
Overcritical of others	1.6	1.8	1.3	0.
Sensitiveness	9.6	8.7	18.7	0.
Domineering, overbearing	22.4	24.2	46.7	2.7
Sullenness, sulkiness	6.9	8.2	20.0	1.3
Stealing	20.1	21.0	38.7	2.7
Shyness	24.4	22.8	28.0	12.0
Physical coward	1.6	1.4	2.7	1.3
Selfishness, unsportsmanly	1.9	1.8	8.0	0.
Temper tantrums	21.8	25.1	49.3	0.
Dreaminess	3.9	3.2	9.3	2.7
Nervousness	64.7	63.0	80.0	36.0
Stubbornness, contrariness	19.1	21.9	44.0	5.3
Unreliable, irresponsible	18.5	18.3	44.0	1.3
Truancy	12.9	13.7	29.3	2.7
Untruthfulness	18.8	19.6	41.3	0.
Cheating	.9	1.4	2.7	0.
Lack of interest in work	28.0	31.5	39.0	16.0
Heterosexual activity	4.4	5.5	6.7	2.7
Enuresis	23.4	22.8	34.7	16.0
Obscene notes, pictures, etc.	.7	0.4	0.	0.
Tattling	1.6	2.3	5.3	1.3
Silliness	1.4	0.9	1.3	1.3
Quarrelsomeness	46.0	48.4	66.7	26.7
Impudence, rudeness	7.3	8.7	17.3	1.3
Imaginative lying	8.9	10.0	14.7	4.0
Inattention	36.6	36.5	49.3	30.7
Slovenly in appearance	4.4	5.0	5.3	0.

TABLE 7 (Continued)

Behavior manifestation or condition	Total problem group %	Problem group *MA* 7-0 to 9-11 %	Serious problem cases Most %	Serious problem cases Least %
Laziness	5.9	5.0	12.0	5.3
Impertinence, defiance	8.6	8.7	22.7	1.3
Carelessness in work	2.9	3.2	2.7	1.3
Thoughtlessness	1.3	0.	2.7	0.
Restlessness	72.3	71.2	77.3	61.3
Masturbation	13.5	14.1	16.0	9.3
Disobedience	37.0	37.0	52.0	28.0
Tardiness	.7	0.4	0.	0.
Inquisitiveness	1.3	1.4	2.7	1.3
Destroying school materials	13.8	12.3	25.3	5.3
Disorderliness	7.9	8.3	17.3	1.3
Profanity	5.6	5.5	13.3	1.3
Interrupting, talkativeness	7.3	9.1	14.7	4.0
Smoking	0.3	0.4	1.3	0.
Whispering	0.9	0.9	0.	0.
Runs away from home	9.9	9.1	21.3	4.0
Plays with fire	6.9	6.0	16.0	1.3
Learning problems	28.0	31.0	29.3	30.7
Speech defects	13.8	12.8	6.7	8.0
Physical defects or disease	35.9	35.6	40.0	36.0
Number of cases	303	219	75	75
Average % of items per child	13.1	14.1	21.5	5.5
Average No. of items per child	7.6	7.8	11.8	3.0

ous problem cases are presented in tables and discussed in the text to follow.

1. *The Total Problem Group*

The behavior of the problem children covers a wide range of problem reactions. The three age divisions show differences in percentages on the 55 items that range from less than 1 per cent to 12 per cent. Differences of more than 7 per cent are infrequent.

The seven-year group shows the greatest excess of problem behavior. The children of this group are 7 to 9 per cent (depending on the item), more unreliable, untruthful, enuretic, restless, and more apt to destroy materials than the eight-year group. They are 7 to 12 per cent more domineering, unreliable, restless, enuretic, destructive, have more speech defects, and do more imaginative lying than the nine-year group.

The eight-year group exceeds the seven-year group by 7 to 11 per cent in lack of interest in work, running away from home, and disobedience. They are 7 to 12 per cent more restless, fearful, stubborn, disobedient, and have more speech defects than the nine-year-olds.

The nine-year group is 7 to 8 per cent above the seven-year cases in lack of interest in work and running away from home. They are 10 per cent more untruthful and 7 per cent more prone to physical defect and disease than the children of the eight-year group.

The decrease in the frequency of certain behavior manifestations with increase in age is present. This indicates the operation of adjustment factors which may be associated with maturation during this period of growth. The average number of items per child in the seven-, eight- and nine-year groups is 8.1, 7.6, and 7.2, respectively. There are wide differences in the percentages for the various items; for example, the writing of obscene notes is present in less than 1 per cent of the cases, while restlessness occurs in 72 per cent. The groups show, in general, similar trends with respect to behavior. Items that occur to a high degree in one age group are likely to be present in other groups to about the same degree.

The behavior manifestations and conditions which occur in 20 per cent or more of the problem group are presented in Table 8. Inattention, disobedience, quarrelsomeness, nervousness, and restless-

TABLE 8

PERCENTAGE OF OCCURRENCE OF BEHAVIOR MANIFESTATIONS AND ASSOCIATED CONDITIONS MOST REPRESENTATIVE OF THE TOTAL PROBLEM GROUP

Behavior manifestation or condition	7-Year group %	8-Year group %	9-Year group %	Total %
Restlessness	78.3	68.6	68.3	72.3
Nervousness	64.9	65.7	63.3	64.7
Quarrelsomeness	45.4	48.6	44.5	46.0
Disobedience	31.9	43.8	35.6	37.0
Inattention	40.2	36.2	33.7	36.6
Physical defects or disease	38.1	31.4	38.6	35.9
Lack of interest in work	22.7	31.4	29.7	28.0
Learning problems	25.8	32.3	25.7	28.0
Shyness	25.7	23.8	23.8	24.4
Enuresis	28.9	21.9	19.8	23.4
Domineering, overbearing	25.8	22.8	18.8	22.4
Temper tantrums	22.7	23.9	18.8	21.8
Stealing	22.7	17.1	20.8	20.1
Number of cases	97	105	101	303

ness are present in 36 to 72 per cent of the children of the total problem group. Physical defects or disease, lack of interest in work, learning problems, shyness, enuresis, overbearing behavior, temper tantrums, and stealing are shown in 20 to 35 per cent of the cases.

The age divisions tend to follow about the same pattern of behavior manifestations. The frequency of occurrence of certain items appears to have some relation to the age of the group. Restlessness, inattention, enuresis, domineering behavior, and temper tantrums decrease with age, and lack of interest in work increases with age. Age, apparently, has little effect upon the incidence of nervousness, quarrelsomeness, physical defect and disease, learning problems, shyness, and stealing, in problem children.

The clinicians' group from Wickman (67) considers domineering and overbearing behavior and stealing as extremely grave problems in a child. These manifestations occur in at least one-fifth of the total number of problem cases, and to the highest degree in the seven-year group.

It is possible that some behavior manifestations only occur at certain periods of growth and maturation; perhaps some clear up automatically as the child becomes more mature; and in the case of others, the character of the manifestations may change with an increase in age. (The effect of chance factors, too, must not be underestimated.)

The clinicians looked upon behavior such as temper tantrums, shyness, lack of interest in work, and nervousness as serious problems. These manifestations were present in 25 to 65 per cent of the children who made up the total problem group. Reactions such as quarrelsomeness, inattention, enuresis, and disobedience were considered of slight consequence, and restlessness of no special import in its effect on the future welfare of a child.

Conditions, such as learning problems and physical defect or disease, occur in over 25 per cent of the problem group. The significance of these in the social development of a child is not easily determined, though, from a practical standpoint, either may be extremely influential, and for this reason they are included as problem conditions.

Over one-third of the problem group show very serious or moderately serious behavior manifestations. The extreme restlessness and nervousness that all these children display suggest that these may be general symptoms of insecurity of one kind or another. It is manifest, from the data obtained on the 303 children of the problem group, that atypical behavior and atypical conditions characterize them to a high degree; their choice as representative problem children seems well established by the findings of the study.

2. *The Problem Cases with Mental Ages 7-0 to 9-11*

The findings on behavior manifestations of the problem cases who have mental ages of 7-0 to 9-11, follow. There are 74 cases with a mental age range of 7-0 to 7-11, 79 cases with a mental age range 8-0 to 8-11, 66 with a mental age range 9-0 to 9-11,—a total of 219. The occurrence of individual items ranges from less than 1 per cent to over 70 per cent. Not one of this group showed what the clinicians call thoughtlessness, but 71 per cent were restless. The mental age divisions are much alike; where one behavior item has a high frequency at one mental age, the others tend to assume a rather similar pattern. The greatest difference in percentages is that between the seven- and nine-year groups; the former has 20.1 per cent more physical handicapping conditions, and is 14 per cent more domineering, than the latter.

The average number of behavior items per child decreases with age. The seven-year mental age group has, on the average, 8.3 items per child, the eight-year mental age group 7.6, and the nine-year mental age group 7.4. These findings agree substantially with those for the problem group as a whole.

The behavior manifestations and conditions most frequently noted in the problem group with mental ages 7-0 to 9-11 are presented in Table 9. There are 14 items in which the group shows a frequency of 20 per cent to 71 per cent. The group with mental ages 7-0 to 7-11 shows the highest percentage for these 14 items, and the nine-year mental age group the lowest; the average is 35 per cent for the group on the 14 items presented in Table 9.

The different mental age groups show about the same behavior picture with the following exceptions: (*a*) the number of the items per child decreases with an increase in mental age; (*b*) the children in the seven-year mental age group are more quarrelsome, have more physical handicaps (defect or disease), are shy and tend to steal more than those of the eight- and nine-year mental age groups, and are more enuretic than the nine-year group; (*c*) the children in the eight-

TABLE 9

PERCENTAGE OF OCCURRENCE OF BEHAVIOR MANIFESTATIONS AND ASSOCIATED CONDITIONS MOST REPRESENTATIVE OF THE PROBLEM GROUPS WITH MENTAL AGE 7-0 TO 9-11, INCLUSIVE

Behavior manifestation or condition	7-0 to 7-11 *MA* %	8-0 to 8-11 *MA* %	9-0 to 9-11 *MA* %	7-0 to 9-11 *MA* Total %
Restlessness	74.3	65.8	72.7	71.2
Nervousness	63.5	62.0	63.6	63.0
Quarrelsomeness	54.5	49.4	40.9	48.4
Disobedience	35.1	40.5	34.8	37.0
Inattention	40.5	29.1	40.9	36.5
Physical defect or disease	45.9	34.2	25.8	35.6
Lack of interest in work	27.0	32.9	34.8	31.6
Learning problems	31.1	34.2	27.3	31.0
Temper tantrums	27.0	27.8	19.7	25.1
Domineering, overbearing	32.4	21.5	18.2	24.2
Enuresis	24.3	26.6	16.7	22.8
Shyness	25.7	20.2	16.7	21.0
Stubbornness, Contrariness	24.3	20.2	21.2	21.9
Stealing	25.7	20.2	16.7	21.0
Number of cases	74	79	66	219

year mental age group are less inattentive and less restless than the seven- and nine-year groups, but are not as obedient and have more learning problems than either. A comparison of the findings for the cases with mental ages 7-0 to 9-11 presented in Table 9 and those for the total problem group in Table 7 reveals no marked difference in behavior manifestations between the two groups. The problem manifestations shown give a heterogeneous picture in terms of reaction and personality; these findings emphasize the complexity of what is termed "problem" behavior.

3. *Selected Problem Cases*

The most and least serious problem cases show the following contrasts and likenesses. The least serious problem cases exceed the most serious cases only in these instance: The seven-year group has more speech defects than the same age group with the most serious problems; the eight-year least serious problem cases are more restless, have more learning problems and slightly more physically handicapping conditions than the corresponding age group having the most problems; the least problem group, as a whole, has slightly more learning problems.

The most and least serious groups are most alike in degree of restlessness, learning problems, and handicapping physical conditions. Both groups show low incidence of discouragement, overcriticalness, physical cowardice, cheating, passing obscene notes and pictures, silliness, tattling, slovenliness in appearance, carelessness in work, thoughtlessness, tardiness, inquisitiveness, and smoking. The most serious group are much more prone to resentfulness, domineering behavior, temper tantrums, nervousness, quarrelsomeness, disobedience, and destructiveness.

The differences in the per cent of children in the most and least serious problem groups who show a given behavior item range from 1 per cent to 49 per cent; the most serious problem cases are to that extent above the least serious cases. Items such as cruelty and bullying, truancy, quarrelsomeness, running away from home, and physical defect or disease, increase markedly with age in the most serious problem group. In the same group there is a notable decrease with age in the incidence of selfishness, unreliability, untruthfulness, enuresis, and laziness.

The least serious group shows an increase in learning problems with age, decrease in masturbation and enuresis and variability in the incidence of restlessness, inattention, lack of interest in work, disobedience, and physically handicapping conditions.

The average number of items per child for the most serious problem group is about four times the number shown by the least serious group. The marked difference in the behavior picture of the least and most serious problem cases is not unexpected in light of the basis by which they were selected.

The items which occur in 20 per cent to 76 per cent of the least serious problem cases appear in Table 10. These are restlessness, nervousness, physical defect or disease, learning problems, quarrelsomeness, inattention, and disobedience. There are considerable differences in the age groups of the least serious problem cases but the frequencies on the above mentioned items are definitely less than for the total problem group (see Table 7) though the incidence of physical defect and disease, and learning problems is about the same. The average for the list of items for the three age groups range from 32 per cent to 40 per cent; a high frequency—but none of the items rank as grave behavior problems. Their presence indicates rather mild

TABLE 10

BEHAVIOR MANIFESTATIONS AND ASSOCIATED CONDITIONS MOST CHARACTERISTIC OF THE LEAST SERIOUS PROBLEM CASES

Behavior manifestation or condition	Percentage of occurrence Chronological age 7	8	9	Total group
Restlessness	64.0	76.0	44.0	61.3
Nervousness	32.0	36.0	40.0	36.0
Physical defect or disease	32.0	24.0	52.0	36.0
Learning problems	20.0	40.0	32.0	30.7
Inattention	32.0	40.0	20.0	30.7
Disobedience	24.0	40.0	20.0	28.0
Quarrelsomeness	24.0	28.0	28.0	26.7
Number of cases	25	25	25	75

TABLE 11

PERCENTAGE OF OCCURRENCE OF BEHAVIOR MANIFESTATIONS AND ASSOCIATED CONDITIONS MOST CHARACTERISTIC OF THE MOST SERIOUS PROBLEM CASES; CHRONOLOGICAL AGE 7-0 TO 9-11, INCLUSIVE

Behavior manifestation or condition	7-Year group %	8-Year group %	9-Year group %	Total %
Nervousness	76.0	76.0	88.0	80.0
Restlessness	88.0	60.0	76.0	77.3
Quarrelsomeness	56.0	60.0	84.0	66.7
Disobedience	44.0	52.0	60.0	52.0
Inattention	44.0	48.0	56.0	49.3
Temper tantrums	52.0	52.0	44.0	49.3
Domineering, overbearing	40.0	56.0	44.0	46.7
Stubbornness, contrariness	48.0	44.0	40.0	44.0
Unreliable, irresponsible	60.0	44.0	28.0	44.0
Fearfulness	44.0	48.0	36.0	42.7
Untruthfulness	60.0	24.0	40.0	41.3
Cruelty and bullying	28.0	32.0	60.0	40.0
Physical defect or disease	40.0	20.0	60.0	40.0
Resentfulness	36.0	44.0	40.0	40.0
Lack of interest in work	28.0	44.0	44.0	39.0
Stealing	44.0	40.0	32.0	38.7
Enuresis	48.0	36.0	20.0	34.7
Learning problems	28.0	28.0	32.0	29.3
Unsocial, withdrawing	28.0	28.0	32.0	29.3
Truancy	16.0	36.0	36.0	29.3
Shyness	28.0	24.0	32.0	28.0
Destroying school materials	28.0	24.0	24.0	25.3
Impertinence, defiance	24.0	24.0	20.0	22.7
Runs away from home	4.0	32.0	28.0	21.3
Sullenness, sulkiness	16.0	24.0	20.0	20.0
Number of cases	25	25	25	75

problems of adjustment, learning difficulties, physically handicapping conditions, and a tendency to general nervousness.

The behavior manifestations that occur in 20 to 80 per cent of the most serious problem cases are presented in Table 11. There are 25 items which show this range in frequency, while in the least serious cases there are only seven items. The average per cent of occurrence of these items for the group is 41 per cent. The list includes grave problems such as domineering and stealing, and the less serious problems such as enuresis and inattention, learning problems, and physically handicapping conditions. Serious maladjustment, personality problems, school difficulties, and delinquent trends are shown.

Unreliability and enuresis decrease considerably with age in the most serious problem group, while nervousness, quarrelsomeness, cruelty and bullying, truancy and running away from home increase. The eight-year age division shows considerably fewer physically handicapping conditions; the nine-year cases are more quarrelsome and nervous.

The tabular summary of behavior manifestations of all problem groups selected for study, given in Table 7, shows that the average number of items per child is lowest (3.0) for the least serious cases, and highest (11.8) for the most serious group. The total problem group and the 7-0 to 9-11 mental age group show an average number per child of 7.6 and 7.8 items respectively.

Conditions that are less discriminating, such as nervousness, inattention, restlessness, disobedience, learning problems, and physically handicapping conditions, tend to show high and somewhat similar percentages. Behavior that suggests deep personality difficulty, namely, resentfulness, cruelty and bullying, stubbornness, unreliability and untruthfulness, shows a consistently higher percentage in the most serious problem group.

4. *Summary*

The findings on the behavior manifestations and associated conditions of the problem group indicate that, as a whole, it is made up of children whose behavior manifestations range in seriousness from very mild maladjustment to grave behavior disorders. The average child of the problem group shows behavior manifestations moderately serious in import.

D. Psychiatric Diagnoses of the Problem Group

The psychiatric diagnosis for each problem child was taken from the case records. The conditions are those found in the official clinic record book, where the main problem is stated, and in some cases, minor conditions having a direct bearing on it are included. Such conditions were considered as part of the official diagnosis for each problem child. Owing to the fact that the research included a complete perusal of the case histories for all items of behavior, physical conditions, and learning problems, there are some differences between physical conditions as obtained from the psychiatric diagnosis presented in Table 12 and those included under physically handicapping conditions in Table 7.

1. *Total Problem Group*

A summary of the psychiatric diagnoses for the total problem group, for the problem group with mental ages 7-0 to 9-11, and for the most and least serious problem cases are presented in Table 12. The list includes behavior problems, conduct disorders, neurotic and psychopathic traits or disorders, specified personality problems, school problems, problems of home care and commitment, problems of mental classification, speech defects, and physical defects and disease. It was not infrequent to find cases with several diagnoses and problem conditions. Notations regarding school problems, home care, placement, level of intelligence, speech defects, and physically handicapping conditions occurred less frequently than diagnoses of behavior problems, neurotic and psychopathic disorders, and personality problems.

Behavior problem was specifically mentioned in 86 per cent of the cases in the total problem group, school problems in 19 per cent, problems of home care in 12 per cent, and personality difficulties in 19 per cent of the cases. Thirty-nine per cent of the total problem group showed neurotic traits and 36 per cent had behavior disorders. The age groups resemble each other rather closely. The eight-year division showed fewer personality problems but more behavior disorders and neurotic traits than the seven- and nine-year groups. The average number of conditions per child for the seven- and nine-year age divisions was 2.5, and for the eight-year division, 2.2.

TABLE 12

Psychiatric Diagnoses of the Selected Problem Groups

Diagnoses	Total group %	*MA* 7-0 to 9-11 %	Least serious %	Most serious %
I. Behavior problem	19.8	18.7	8.0	24.0
Primary behavior problem or disorder	36.3	38.8	8.0	42.7
Conduct disorder or disturbance	18.4	22.8	10.7	28.0
Habit disorders				
(a) tantrums, enuresis	1.6	2.3	5.3	0.
(b) sex problems (masturbation, sex problems, perversions)	4.0	3.6	4.0	1.3
(c) delinquent tendencies (truancy, home and school wanderlust)	5.9	4.6	2.7	10.7
II. Neurotic traits or disorder	38.9	39.3	18.7	42.7
Psychopathic (traits, personality, or emotionality)	9.0	5.5	0.	17.3
Hyperkenesis	9.2	10.0	4.0	9.3
III. Personality problems (specified)				
(a) withdrawing behavior (fearful, inhibited, asocial)	2.6	2.3	2.7	4.0
(b) aggressive (self-willed, destructive, attention-seeking)	4.9	6.0	0.	9.3
(c) maladjustment (unspecified)	4.9	5.5	1.3	10.7
(d) psychoneurosis (anxiety, obsessional types, depression)	5.6	9.1	1.3	12.0
IV. School problems				
(a) reading disability or retardation	13.2	16.0	20.0	6.7
(b) school problem or placement	6.6	5.5	5.3	8.0
V. Problems of home care (undisciplined, neglected, rejected, sibling rivalry)	12.5	10.9	2.7	10.7
VI. Problems of placement or commitment	8.2	9.1	20.0	1.3
VII. Intelligence classified				
(a) superior	1.6	0.4	2.7	1.3
(b) average	9.6	13.7	24.0	8.0
(c) retarded or defective	10.6	4.1	1.3	0.
VIII. Speech defects	2.0	1.4	4.0	1.3
IX. Physical defects or disease				
(a) ear, nose and throat conditions	0.7	0.9	1.3	2.7
(b) eye defects and related conditions	2.0	1.8	4.0	0.
(c) miscellaneous (includes epilepsy, hemiplegias, paralyses, cardiac and T.B. conditions, syphilis, pyknolepsy, glandular conditions, encephalitis, dwarfism, malnutrition, chorea)	10.5	10.5	16.0	4.0
Number of cases	303	219	75	75

2. *Problem Group with Mental Ages 7-0 to 9-11, Inclusive*

The psychiatric diagnoses of the problem cases with mental ages 7-0 to 9-11 appear in Table 12. The group with mental ages 7-0 to 7-11 has a larger number of cases with delinquent tendencies (5 per cent), aggressive personality reactions (11 per cent), and mental retardation (9.5 per cent), though these percentages are not high.

The problem children with mental ages 8-0 to 8-11 lead in percentage of unspecified behavior problems (21 per cent), primary behavior problems and disorders (42 per cent), conduct disturbances (30 per cent), tantrums and enuresis (4 per cent), sex problems (6.3 per cent), and neurotic traits (4.3 per cent). They also show more withdrawing behavior, reading disabilities, problems of home care and placement, eye defects and miscellaneous (physically handicapping) conditions, although differences from the seven- and nine-year groups in these are slight.

The 9-0 to 9-11 mental age group show more psychopathic traits (10.6 per cent), hyperkinesis (15 per cent), unspecified maladjustment (7.6 per cent), psychoneurosis (16.7 per cent), school problems (16 per cent) and diagnoses of average intelligence, and speech defects (3 per cent), than the seven- and eight-year mental age groups. The greatest differences in the percentages are found in the incidence of psychoneurosis for the nine-year mental age group which had over 16 per cent, whereas the eight-year group had less than 3 per cent. The eight-year mental age group is highest in conduct disorders (30.4 per cent), while in the seven- and nine-year mental age groups 18 per cent show this diagnosis.

The average number of diagnoses for each child in the 7-0 to 7-11 mental age group is 2.2, and for the eight- and nine-year groups, 2.6 and 2.5, respectively.

3. *Most and Least Serious Problem Cases*

The psychiatric diagnoses of the most and least serious problem cases are summarized in Table 12. The least serious cases have higher percentages of reading disability, problems of placement, of mental classification, and miscellaneous physical defects and disease. They also show a slightly higher incidence of enuresis and temper tantrums, sex problems, defective speech, and eye defects. The most serious problem group has a higher percentage of cases with behavior problems, behavior and conduct disorders, delinquent tendencies, neurotic and psychopathic traits, unspecified maladjustment, and problems of home care. The average number of diagnoses per child in the more serious problem cases is 2.7, and for the least serious cases, 1.6. A diagnosis of behavior problems occurs two and two-thirds times more often in the most serious problem group; neurotic, psychopathic, or hyperkinetic conditions occur three times more frequently, and specified personality problems eight times more frequently. The low incidence of physical defects and disease, reading disability and problems of placement, with no mention of tantrums, sex problems, and withdrawing behavior in the more serious group is a discriminating finding. The difficulties of the most serious problem group are therefore, mainly psychological and behavioral in character.

4. *Summary of Psychiatric Diagnoses of the Selected Problem Groups*

The most serious problem cases have a higher percentage of the more specific psychiatric problems involving behavior, neurotic, and personality disorders. They are mental hygiene problems mainly because of advanced maladaptation in behavior and personality, while reading disabilities, problems of placement, and physically handicapping conditions tend to typify the least serious problem cases.

The average number of psychiatric diagnoses given for each child is 2.7 in the most serious problem group, 2.5 in the group with mental ages 7-0 to 9-11, 2.4 in the total problem group, and 1.6 in the least serious problem group. The total problem group and the group with mental ages 7-0 to 9-11 have about the same number and type of psychiatric problems. This similarity was also present in respect to behavior manifestations. A behavior problem category occurs in a ratio of more than one to a child in the most serious problem group, while problems of placement, speech defects, and physical defect and disease are infrequently mentioned in the psychiatric diagnoses of these cases.

E. COMPARISON OF PRIMARY AND DERIVED TEST FINDINGS FOR GROUPS STUDIED

The material presented on the following pages deals with the primary test findings and derived data of the study. Tables which summarize the findings accompany the discussions. Experimental groups are compared, and conclusions drawn.

1. *Findings after Grouping Stanford-Binet Subsidiary Tests into Categories*

The subsidiary tests of the Stanford-Binet scale have been grouped into nine categories[9] according to the mental function each purports to measure. The categories are language, comprehension, invention and reasoning, comparison and judgment, imagery, information (general and personal),[10] memory, perception and coördination, and number relations. Percentage for each category, the reliability of percentages, and the reliability of the differences between percentages in the categories for all groups compared have been computed, and findings are presented in tabular form for all groups.

a. Percentages of success in categories, total problem, and normal groups. The percentages of success in categories for the seven-, eight-, and nine-year-old problem and normal groups are presented in Table 13. Certain trends are apparent: first, the percentage of success in categories increases with age (this would be expected), second, the percentage of success varies among the different categories—the highest percentage of success is for information and the lowest for imagery; third, the problem and normal groups do not differ widely in percentages of success in any category. The largest difference shown is 9.2 per cent in the category of invention and reasoning and is in favor of the eight-year-old normal group. With a few exceptions, differences in percentages in categories, when they occur, tend to be in favor of the normal groups. The exceptions noted are: the seven-year-old problem group has a slightly higher percentage on tests of imagery, and the nine-year problem group has higher comprehension scores.

The range in percentage of success shown for the different categories can be attributed to age, mental-age factors, and to placement of tests in the Stanford-Binet. For example, most of the information tests appear at the lower test levels of the Stanford-Binet, and, there-

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[9] See explanation of categories in Chapter III. The percentage of success in a category is obtained by dividing the total number of tests passed in a category by the total possible number of successes.

[10] This category will be listed as "information" in the text to follow.

TABLE 13

Percentages of Success on Categories for Total Groups

	(*a*) Total problem and normal groups								(*b*) Mental age groups								(*c*) Selected problem	
	Chronological age						Total		Mental age						Total		Totals	
	7-0 to 7-11		8-0 to 8-11		9-0 to 9-11				7-0 to 7-11		8-0 to 8-11		9-0 to 9-11				Most Serious	Least Serious
Categories	Prob. %	Nor %	Prob. %	Nor. %	Prob. %	Nor %	Prob. %	Nor. %	Prob. %	Nor %	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %	%	%
Language	19.0	20.0	26.6	29.3	31.7	33.0	25.9	27.4	19.4	20.4	25.3	24.0	33.8	30.0	25.9	25.0	25.8	27.3
Comprehension	61.4	63.5	70.1	71.3	78.4	76.4	70.1	70.4	62.4	55.7	71.3	69.2	77.1	77.9	70.0	76.0	69.9	71.8
Invention and reasoning	11.9	16.1	30.6	35.0	37.8	41.0	25.2	30.5	12.0	7.1	29.5	33.3	45.2	48.3	28.3	31.1	26.8	26.8
Comparison and judgment	35.6	39.0	44.3	48.5	49.8	53.8	44.4	47.0	37.4	35.9	43.3	42.8	52.9	53.9	44.2	44.5	44.5	45.3
Imagery	00.3	00.2	0.0	3.2	2.7	6.5	1.0	3.3	0	0	0	0	0	0	0	0	.3	1.7
Information	83.2	90.6	92.9	97.8	95.5	95.1	90.6	93.6	86.8	90.8	93.4	96.6	97.2	99.2	92.3	96.3	89.5	90.8
Memory	35.5	39.5	44.5	49.0	48.8	53.9	43.1	47.1	37.8	37.4	53.4	47.9	51.4	54.9	43.8	47.2	45.3	43.4
Perception and coördination	82.5	83.2	93.6	94.6	95.0	95.4	90.2	91.3	86.9	86.4	94.6	94.3	96.7	98.7	93.4	93.6	92.0	93.3
Number relations	76.5	84.4	90.5	91.5	91.8	96.2	86.4	90.7	80.6	84.0	89.9	96.9	98.0	98.3	89.2	93.9	90.2	85.8
No. of cases	97	105	105	94	101	104	303	303	74	50	79	76	66	60	219	186	75	75
Median mental age	7-4	7-8	8-7	8-11	9-5	9-5	8-5	8-8	7-6	7-4	8-5	8-5	9-4	9-6	8-5	8-6	8-5	8-6

fore, a higher percentage of success can be expected from all groups. On the other hand, tests of imagery, and invention and reasoning appear mostly in the higher year-levels of the Scale and are, in a measure, beyond the mental capacity of average children seven, eight, and nine years old.

Since the median mental ages of the problem and normal groups are practically the same, and the differences in percentages of success in categories between the problem and normal groups small, there appear to be no outstanding differences in mental functioning patterns of the problem and normal groups. The increase in percentage of success shown in many of the categories, with an increase in age and mental age in both the problem and normal groups, suggests that success in these categories is influenced by growth or maturation factors more than by problem and non-problem behavior. All differences found between groups, however, will be subjected to statistical check for significance further on in the text.

b. Percentages of success in categories for the problem and normal groups, mental ages 7-0 to 9-11, inclusive. The findings in the categories for the problem and normal groups when the mental-age range is 7-0 to 9-11 inclusive are presented in Table 13. There are 33 more problem cases than normal cases that have mental ages between 7-0 and 9-11. This difference in numbers apparently had limited effect upon the total results in the categories as can be seen by reference to the totals in this table.

The problem and normal groups with chronological and mental ages ranging from 7-0 to 9-11 show relatively small differences in percentages of success in the categories. Some of these are in favor of the problem cases and some in favor of the normal groups. Tests of imagery are too difficult for both groups, and the information tests are relatively easy for them.

The findings for the categories are presented in Table 13 for all totals—problem and normal, for problem and normal cases with mental ages 7-0 to 9-11, and for the most and least serious problem cases. All the groups are more alike than different in percentages of success in categories. Differences that do appear are less than 9 per cent. The results on reliability for all groups on the categories, and the reliability of the differences of the percentages obtained by the groups compared, follow in the text.

c. Summary. The data given on percentages of success in categories show, on the whole, that differences between the groups compared are small. A difference of more than 6 per cent on the categories rarely occurs. Where differences are present, the normal groups show the higher percentages of success. Since the median mental ages (see Table 13), for the four groups differ in no instances by more than three months, all groups are, therefore, roughly comparable from a statistical standpoint.

2. *The Reliability of Percentages of Success on Mental Categories*

After percentages of success on the various categories were obtained for all groups, the reliability of the findings in respect to the populations from which they were drawn was computed. This was determined in the present study by subjecting the percentages on the categories to a statistical check for reliability, using the formula from Garrett (14, p. 227) for the standard error of a percentage. The formula for the standard error of a percentage is as follows:

$$\sigma_p = \sqrt{\frac{pq}{N}} \qquad (45)$$

in which p is the percentage of times success on a category occurs; q is equal to 1 minus p, and N is the number of cases. The reliability of a percentage shown by a group on a category is measured by its standard error. The standard error of a percentage indicates to what extent a group diverges from the "true" percentage of the population from which it is drawn.[11]

In the present study the groups were selected randomly and are believed to be "typical" of the population from which they were drawn, in which case the chances are 68 in 100 that the "true" percentage of a group in a category will lie within the limits of plus and minus one standard error, and it is reasonably certain to fall within the limits of plus and minus three standard errors. The size of a standard error depends upon the size of the percentage for the group and upon the number of cases in the group. Standard errors are expressed in terms of per cent: a small standard error indicates a small amount of probable divergence and the percentage on which it is based is, consequently, more reliable.

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[11] The true measure of a group takes into account all members of the larger group from which the experimental group was drawn.

a. Problem and normal groups. The standard errors of percentages for the problem and normal groups in each category and according to age division are presented in Table 14; these vary according to category and group. In the case of the seven-year problem and normal groups the highest standard error is 4.9 per cent for the problem group on memory, and the lowest standard error is .4 per cent for the normal seven-year group on imagery.

Using the interpretation of Garrett (14) for the standard error of a percentage, it is reasonably certain that the groups similar in age and mental make-up to those of the experimental groups will obtain on any category a percentage of success somewhere within the range defined by plus or minus three standard errors. The seven-year problem group has a percentage of success on memory test of 35.5, and a standard error of 4.9 per cent, therefore the percentage of success for similar groups is practically certain to fall within a range of 20.8 to 50.2 per cent (plus and minus three standard errors), and they have 68 chances in 100 of being within a range of 30.6 to 40.4 per cent. The normal seven-year group has a standard error of 4.8 per cent on the memory test, and a percentage of success of 39.5; the chances are 68 in 100 that the percentage of seven-year normal children of like age and mental ability, lies within a range of 34.7 to 44.3 per cent. In the case of other categories the limits between which the percentages for the population range can likewise be defined.

The standard errors are much the same for both the problem and normal groups in the individual categories, as may be noted by reference to Table 14 the percentages of success for both groups on these categories vary little, and therefore considerable overlapping can be expected from similar samplings studied under like conditions. Standard errors are smaller for both groups where the percentage of success on categories is very high or very low. For example, imagery tests are passed by less than 1 per cent of both groups, and information by 80 per cent or more, and the standard errors range from less than 1 to 3.8 per cent on these categories.

The standard errors of the percentages on the categories for eight-year-old problem and normal groups are also presented in Table 14.

TABLE 14

STANDARD ERRORS OF PERCENTAGES ON CATEGORIES

	(*a*) Total problem and normal groups								(*b*) Mental age groups								(*c*) Selected problems	
	Chronological age								Mental age									
	7-Yr. Gr. Stand. Er.		8-Yr. Gr. Stand. Er.		9-Yr. Gr. Stand. Er.		Total groups Stand. Er.		7-0 to 7-11 Stand. Er.		8-0 to 8-11 Stand. Er.		9-0 to 9-11 Stand. Er.		Total groups Stand. Er.		Total groups Stand. Er.	
Categories	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %	Most %	Least %
Language	4.0	3.9	4.3	4.7	4.6	4.6	2.4	2.6	4.6	5.7	4.9	4.9	5.8	5.9	3.0	3.2	5.1	5.1
Comprehension	4.8	4.7	4.5	4.7	4.2	4.1	2.6	2.6	5.6	7.0	5.1	5.3	5.8	5.2	3.1	3.1	5.3	5.2
Invention and reasoning	3.3	3.6	4.5	4.9	4.8	4.8	2.5	2.6	3.7	3.6	5.1	5.4	6.1	6.5	3.0	3.4	5.1	5.1
Comparison and judgment	4.8	4.7	4.8	5.2	5.0	4.9	2.8	2.9	5.6	6.8	5.6	5.6	6.1	6.4	3.3	3.6	5.7	5.7
Imagery	0.6	0.4	0.0	1.4	1.6	2.4	0.6	1.0	0.	0.	0.	0.	0.	0.	0.	0.	0.6	1.4
Information	3.8	2.9	2.5	1.5	2.0	1.7	1.7	1.4	3.9	4.1	2.8	2.1	2.0	3.6	1.8	1.6	3.5	3.5
Memory	4.9	4.8	4.9	5.2	5.0	4.9	2.8	2.9	5.6	6.8	5.7	5.7	6.1	6.4	3.3	3.6	5.7	5.7
Perception and coördination	3.9	3.6	2.4	2.2	2.2	1.8	1.7	1.6	3.9	4.9	2.4	2.6	2.2	1.4	1.4	1.7	3.1	2.9
Number relations	4.4	3.6	2.8	2.8	2.7	1.8	1.9	1.7	4.6	4.8	3.3	2.0	1.7	1.7	2.2	1.7	3.4	4.0
Number of cases	97	105	105	94	101	104	303	303	74	50	79	76	66	60	219	186	75	75
Median mental age	7-4	7-8	8-7	8-11	9-5	9-6	8-5	8-8	7-6	7-4	8-5	8-5	9-4	9-6	8-5	8-6	8-5	8-6

In some categories the standard error is 5 per cent or more (memory, etc.) and in others as small as 1 per cent (imagery). In a given category both problem and normal groups tend to show about the same reliability; categories with the highest and lowest percentages of success have the least tendency to variability. In view of the similarity of the eight-year problem and normal groups in percentages of success on categories and corresponding likeness in size of standard errors, a random sampling of problem and non-problem children of similar age and intelligence is likely to show much the same percentages of success on the categories.

The reliability of the percentages on the categories for nine-year problem and normal groups is similar to that found for the seven- and eight-year groups. Standard errors for the categories according to group are presented in Table 14. The size of standard errors varies from 1.6 to 2.4 per cent (imagery and information) to five per cent (comparison and judgment, and memory). The trends are the same as those found for the seven-and eight-year groups, i.e., standard errors are smaller where the percentages for any given category are very low or very high. The ranges within the limits of plus or minus one standard error for both groups show overlapping. Little variation can therefore be expected between randomly selected groups of problem and non-problem children of like age and intelligence on the percentage of success in the categories.

The percentages of success in each category, the standard errors of the percentages, and the ranges within the limits of plus or minus one standard error for the percentages on the categories for the total problem and normal groups are presented in Table 15. The chronological ages of both groups range from 7-0 to 9-11. The standard errors are all less than 3 per cent, and there is close agreement with those for the individual categories. The effect of consolidating the findings on the various categories for the three age groups (seven, eight, and nine year) lessens variability and concurrently increases reliability by restricting the range wherein the "true" percentage for the population as a whole lies.

The trend shown on categories in the initial age groups in regard to overlapping between the problem and normal groups remains, except for the categories invention and reasoning, imagery, and number relations. In these the problem group does not overlap with the

TABLE 15

PERCENTAGES OF SUCCESS ON CATEGORIES, STANDARD ERRORS OF PERCENTAGES, AND LIMITS OF PLUS AND MINUS ONE STANDARD ERROR FOR TOTAL GROUPS

	Success on categories		Standard error of percentages		Limits of plus and minus one Stand. Er.	
Categories	Prob. %	Nor. %	Prob. %	Nor. %	Prob. %	Nor. %
(*a*) Total problem and normal groups						
Language	25.9	27.4	2.4	2.6	23.5-28.3	24.8-30.0
Comprehension	70.1	70.4	2.6	2.6	67.5-72.7	67.8-73.0
Invention and reasoning	25.2	30.5	2.5	2.6	22.7-27.7	27.9-33.1
Comparison and judgment	44.4	47.0	2.8	2.9	41.6-47.3	44.1-49.9
Imagery	1.0	3.3	0.6	1.0	0.4- 1.6	2.3- 4.3
Information	90.6	93.6	1.7	1.4	88.3-92.3	92.2-95.0
Memory	43.1	47.1	2.8	2.9	40.3-45.9	44.2-50.0
Perception and coördination	90.2	91.3	1.7	1.6	88.5-91.9	89.7-92.9
Number relations	86.4	90.7	1.9	1.7	84.5-88.3	89.0-92.4
Number of cases	303	303				
Median mental age	8-5	8-8				
(*b*) Mental age groups						
Language	25.9	25.0	3.0	3.2	22.9-28.9	21.8-28.2
Comprehension	70.0	76.0	3.1	3.1	66.9-73.1	72.9-79.1
Invention and reasoning	28.3	31.1	3.0	3.4	25.3-31.3	27.7-34.5
Comparison and judgment	44.2	44.5	3.3	3.6	40.0-47.5	40.9-48.1
Imagery	0.0	0.0	0.0	0.0	0.0- 0.0	0.0- 0.0
Information	92.3	95.3	1.8	1.6	90.5-94.1	93.7-96.9
Memory	43.8	47.2	3.3	3.6	40.5-47.1	43.6-50.8
Perception and coördination	93.4	93.6	1.4	1.7	92.0-94.8	91.9-95.3
Number relations	89.2	93.9	2.2	1.7	87.0-91.4	92.2-95.6
Number of cases	219	186				
Median mental age	8-5	8-6				
(*c*) Selected problem						
Language	25.8	27.3	5.1	5.1	20.7-30.9	22.2-32.4
Comprehension	69.9	71.8	5.3	5.2	64.6-75.2	66.6-77.0
Invention and reasoning	26.8	26.8	5.1	5.1	21.7-31.9	21.7-31.9
Comparison and judgment	44.5	45.3	5.7	5.7	38.8-50.2	39.6-51.0
Imagery	00.3	01.7	0.6	1.4	0.0-00.9	00.3-03.1
Information	89.5	90.8	3.5	3.3	86.0-93.0	87.5-94.1
Memory	45.3	43.4	5.7	5.7	39.6-51.0	37.7-49.1
Perception and coördination	92.0	93.3	3.1	2.9	88.9-95.1	90.4-96.2
Number relations	90.2	85.8	3.4	4.0	86.8-93.6	81.8-89.8
Number of cases	75	75				
Median mental age	8-5	8-6				

normal group if a range for the "true" percentages on the basis that 68 chances in 100 (plus and minus one standard error) is considered indicative. There would be overlapping, however, were the range of percentages found on the basis of plus and minus three standard errors. The categories whose percentages are more reliable are imagery, information, perception and coördination, and number relations.

The standard errors for the categories perception and coördination, information, and number relations decrease in size with an increase in age from the seventh to the ninth year. Language, comprehension, comparisons and judgment, imagery, and memory, show no definite trend with an increase in age of the groups, as may be noted by reference to Table 14.

The total problem and normal groups show small standard errors on all categories. The category, imagery, is not affected by age nor by an increase in number of cases. The results from the total groups on the categories are less subject to variability and are thus more reliable than those from the age divisions of the total problem and normal groups. The highest standard error is 2.9 per cent. This is small in light of the size of most of the standard errors on the categories for the age divisions of the problem and normal groups. The findings in respect to reliability show that groups with a strong trend in either a positive or negative direction on a category have small standard error of percentages on these categories. Therefore random sampling from the population as a whole can be expected to follow a like pattern on similar categories.

b. Problem and normal groups, mental age 7-0 to 7-11 inclusive. The standard errors of percentages on categories for the 74 problem and 50 normal cases taken from the total groups who have a mental age range of 7-0 to 7-11 are presented in Table 14 along with those whose mental age range is 8-0 to 8-11, and 9-0 to 9-11. With the exception of invention and reasoning and information, the normal cases with mental ages 7-0 to 7-11 have larger standard errors for the categories, although the largest difference in standard errors between groups is only 1.4 per cent. The least variability is shown for both groups on invention and reasoning. There are no successes on imagery tests for the problem and the normal cases who have this mental age range.

Translating the standard error in terms of percentage range for the sundry categories, there is consistent overlapping wherein the chances are 68 in 100 that the "true" percentages are within a given range for both groups. Problem and normal groups of like chronological ages (7-0 to 9-11) and having similar mental age range, when drawn randomly from the population are therefore likely to show similar variability and overlapping on the categories. The problem children are apt to have higher scores in comprehension, invention and reasoning, comparison and judgment; the normal children are better in language, information, and number relations.

The standard errors on categories for the 79 problem and the 76 normal cases, whose mental age range is 8-0 to 8-11 are presented in Table 14. The groups do not differ to any appreciable extent in variability on the categories except in the case of number relations, on which the normal cases show considerably less variability. There are no successes on tests of imagery for either group. The largest standard error is 5.7 per cent (memory) for both groups.

In computing the range wherein the "true" percentages on the categories lie for the total population, on the basis of 68 chances in 100 (plus and minus one standard error), there is considerable overlapping between normal and problem cases.

The standard errors of percentages of categories for the 66 problem cases and 60 normal cases from the total groups whose mental ages range from 9-0 to 9-11 may be noted in the third column of Table 14. The highest standard error is 6.5 per cent (invention and reasoning) for the normal cases, and the lowest standard error is 1.7 per cent for both problem and normal groups on number relations. The groups have no successes on tests of imagery. In other categories the standard errors differ little between the two groups. The range for the limits wherein the "true" percentages lie (plus and minus one standard error), 68 chances in 100, shows consistent overlapping, the normal cases have the higher limits.

The percentages on the categories and the standard errors of total problem and normal groups with mental ages 7-0 to 9-11 are presented in Table 15. There are 219 problem cases and 186 normals. The standard errors are smaller than those shown for the cases of the three mental-age divisions. The highest standard error is 3.6 per cent (normal group) on comparisons and judgment, and the smallest 1.4 per cent (problem group) on perception and coördination. Overlapping in ranges for the "true" percentages (68 chances in 100) is present except in number relations.

An increase in the number of cases with an increase in mental-age range results in percentages on the categories that show smaller standard errors. Consequently the percentages for these groups are more reliable. By comparison of the percentages on the categories for the seven- to nine-year mental-age groups (Table 13), with the finding in Table 15 for the total group, it may be observed that some of the characteristics of both groups disappear in the larger distribution. The seven-year mental-age group has lower percentages on the categories; the nine-year mental-age group have higher percentages than those given for the combined groups.

c. Most and least serious problem cases. The standard errors of percentages for problem cases with the most and least serious behavior problems are presented in Table 15. There are 75 cases in each group. The largest standard errors are shown for comparisons and judgment, and memory, and the smallest on imagery and perception and coördination. Both groups have about the same size standard errors, none differing by more than 1 per cent. The reliability of the groups on the categories is more consistent than the reliability for the individual categories, i.e., standard errors vary more in size from category to category than from group to group.

The most and least serious problem cases are more alike than different in reliability of percentages shown on the categories. These groups resemble the groups with mental ages of 8-0 to 8-11 more than other groups. They overlap in ranges for limits of "true" percentages (plus and minus one standard error) in the categories. There is least overlapping in the category, imagery; the least serious group shows higher possibilities for success. Categories that have very high or very low percentages of success have the smallest standard errors. This was the case in other groups.

The reliability of percentages on categories for the groups selected (see Table 14) on the basis of chronological age division, mental age division, and according to degree of seriousness of problem behavior, show the following range in standard errors: language, 3.9 to 5.9 per cent; comprehension, 4.1 to 7.0 per cent; invention and reasoning, 3.3 to 6.5 per cent; comparison and judgment, 4.7 to 6.8 per cent; imagery, 0 to 2.4 per cent; information, 1.5 to 4.1 per cent; memory, 4.8 to 6.8 per cent; perception and coördination, 1.4 to 4.9 per cent; and number relations, 1.7 to 4.8 per cent. There is a tendency for the groups to differ in reliability of percentages on the categories, but this is not more pronounced in the case of any one group.

d. Summary of findings on reliability of percentages for all groups.

1. All groups compared, whether on the basis of chronological age, mental age, or seriousness of problem behavior, tend to be more alike than different in the reliability of percentages shown on any single category.
2. Grouping all problem and normal cases, whether on the basis of chronological age or mental age (Table 14), brings about a definite decrease in the standard errors except in the case of imagery, which does not change appreciably. The reliability, therefore, of the percentage of any category (except imagery) is increased when the range of chronological age or the range of mental age from which the cases are drawn is increased, and the number of cases is likewise increased.
3. Groups of comparable median mental ages are alike in variability of percentages on some of the categories and unlike in others. For example, the group with mental ages ranging from 8-0 to 8-11 has about the same size standard errors of percentages in all the categories (except information and perception and coördination), as the most and least serious problem cases.
4. In all groups, any category with a very high percentage of success (information) or one with a low percentage (imagery) showed consistently small standard errors, indicating that a strong trend in either direction tends to hold up well under tests of reliability.
5. Depending on the group, reliability of the percentages for the sundry categories ranges from less than 1 per cent to 7 per cent.
6. There is consistent overlapping in all groups (see Table 15) compared if the limits within the range of plus and minus one standard error of the percentages for any category are computed.

3. *The Standard Errors of the Difference between Percentages on the Categories*

The findings that follow concern the differences on categories for the various groups in terms of differences of percentages, and standard errors of the difference.

Standard errors of the difference of percentages for all categories for each age and mental age division of all groups compared, were computed and for the most and least serious problem cases. The following formula from Garrett (14, p. 228) was used to compute the standard error of the difference between two uncorrelated percentages in which σ_{p1} is the standard error of a percentage on a category for the problem group, and σ_{p2} is the standard error of a percentage on a category for a non-problem group.

$$\sigma_{D_p} = \sigma_{p1 - p2} = \sqrt{\sigma^2_{p1} + \sigma^2_{p2}} \qquad (46)$$

The standard error of the difference between the percentages of two groups on a category indicates the reliability of the difference between the two groups. A difference in percentage equal to plus three standard errors of the difference is considered significant, since there is only 1 chance in 1000 that a difference as large as this, will arise when the true difference is zero. The differences in percentages on a category and the size of the standard errors of the percentages for the group compared determine the size of the standard errors of the difference.

a. Total problem and normal groups. The standard errors of the difference between the percentages for the problem and normal groups by age and for the total groups are presented in Table 16. The differences in percentages between the groups on the various categories range from less than 1 per cent to 7.9 per cent. The standard errors of the percentages range from less than 1 per cent to 7.1 per cent.

In the seven-year groups the standard errors of the difference range from less than 1 per cent to 6.9 per cent. In all categories except invention and reasoning, and number relations, the standard errors of the difference for the seven-year-olds are larger than difference found in terms of percentage.

The eight-year groups have standard errors of the difference in percentages on the categories that range from 1.4 to 7.1 per cent. In all categories except invention and reasoning, information and imagery, the size of the standard errors of the difference is greater than the difference in terms of percentage, a trend that was also present in the seven-year groups.

The nine-year groups show trends similar to those found in the seven- and eight-year groups. Only in the categories, imagery and number relations, are the standard errors of the difference smaller than the difference in terms of percentage.

When the total findings for the various categories of the seven-, eight-, and nine-year groups are consolidated, the standard errors of the difference in percentages decrease in size. These range from 1 to 4 per cent. Widening the age range and increasing the number of cases decreases the size of the standard error of the difference. But since differences in percentages on categories are smaller than standard errors of the difference in percentages, except for the categories invention and reasoning, imagery, information and number relations, the differences between the total problem and normal groups are small.

b. Problem and normal groups, mental age 7-0 to 9-11, inclusive. The findings in terms of standard errors of the differences between these groups when the mental age range is 7-0 to 9-11, are presented in Table 16. The standard errors of the difference are somewhat larger than those found for the problem and normal groups, in which the range of mental age has not been controlled. In the mental age groups, 7-0 to 7-11, 8-0 to 8-11, and 9-0 to 9-11, the standard errors of the difference are consistently larger than the difference in percentages for the groups on the various categories. By controlling the range of mental age, the probability of a "true" sampling of the population to show significant differences in these categories decreases.

When the findings for the three mental-age groups are consolidated, the standard errors of the difference for the groups decrease in size, although only the categories, comprehension, information, and number relations show standard errors of the difference smaller than their differences in percentage. The mental functioning of the problem and normal groups with mental ages 7-0 to 9-11 on the categories is therefore much the same.

c. Total selected groups. The standard errors of the differences for the total problem and normal groups, the total groups with mental age 7-0 to 9-11, and the problem cases with the most and least serious behavior manifestations are presented in Table 16. The standard errors of the differences of percentages on the categories for the least and most serious problem groups are larger than those of other groups. The total problem and normal groups have smaller standard errors of the difference in percentages on the categories than the mental age groups and the least and most serious problem cases, except in imagery,

TABLE 16

Percentage Differences and Standard Errors of the Difference between Groups on the Categories

	(a) Total problem and normal groups								(b) Mental age groups						(c) Selected problem			
	Chronological age								Mental age						Total Groups		Most and least Problem cases	
	7-yr. Gr.		8-yr. Gr.		9-yr. Gr.		Total Groups		7-0 to 7-11		8-0 to 8-11		9-0 to 9-11					
Categories	% D	St. Er. of D	% D	St. Er. of D	% D	St. Er. of D	% D	St. Er. of D	% D	St. Er. of D	% D	St. Er. of D	% D	St. Er. of D	% D	St. Er. of D	% D	St. Er. of D
Language	1.0	5.6	2.7	6.4	1.3	6.5	1.5	3.6	1.0	7.3	1.3	6.9	3.8	8.5	0.9	4.4	1.5	7.2
Comprehension	2.1	5.0	1.2	6.5	2.0	5.6	0.3	3.7	6 7	8.9	2.1	7.3	0.8	7.8	6.0	4.3	1.9	7.4
Invention and reasoning	4.2	4.9	4.4	6.7	3.2	6.8	5.3	3.6	4.9	5.2	3.8	7.4	3.1	8.9	2.8	4.5	0.0	7.2
Comparison and judgment	3.4	5.0	4.2	7.1	4.0	7.0	2.6	4.0	1.5	8.7	0.5	7.9	1.0	8.8	0.5	4.8	0.8	8.1
Imagery	0.1	0.7	3.2	1.4	3.8	2.8	2.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4
Information	7.4	4.8	4.9	2.9	0.6	2.6	3.0	2.2	4.0	5.7	3.2	3.5	2.0	4.1	3.0	2.4	1.3	4.8
Memory	4.0	6.9	4.5	7.1	5.1	7.0	4.0	4.0	0.4	8.7	5.5	8.0	5.5	8.8	3.4	4.9	1.9	8.1
Perception and coördination	0.7	5.2	1.0	3.3	1.4	2.8	1.1	2.2	0.5	6.2	0.3	3.6	2.0	3.0	0.2	2.2	1.3	4.2
Number relations	7.9	5.6	1.0	4.0	4.4	3.1	4.3	2.5	3.4	6.6	7.0	3.9	0.3	2.4	3.7	2.8	4.4	5.2

information and perception, and coördination. Therefore, with the exceptions noted, the two latter groups can vary more than they do in percentages of success on the categories before differences are sufficiently large to be significant.

d. Summary.

1. Standard errors of the differences of percentages between groups compared on the various categories tend to be larger than the standard errors of the percentages for the individual problem and normal groups. In other words, the reliability of the obtained percentages on the categories for all problem or normal groups is greater than the reliability of the differences between them. Groups therefore must show larger differences in percentages on categories before differences become significant to the point of critical differentiation.
2. The standard errors of the difference between groups on the categories vary in size from less than 1 per cent to 8.9 per cent. Similar differences in percentages, therefore, if these are 5 per cent or less, in any two categories such as information, and comparison and judgment are widely different in significance, for any two groups compared.
3. Increasing the age range, or restricting mental age within the same limits as the chronological age, i.e., 7-0 to 9-11, and increasing the number of cases in a group brings about a decrease in the size of *the standard errors of the difference between groups. This is to be* expected as in the larger groups weak negative or positive trends tend to balance one another, whereas by restricting the mental age range the test items that a given group will pass are somewhat limited.

4. *The Significance of the Difference Found on the Categories for the Groups Compared*

The significance of the differences found on the categories for the groups compared is considered in the light of differences (*a*) in terms of standard errors of the difference in percentages, and (*b*) in terms of chances in 100 for one group to show superiority over another.

According to Garrett (14, p. 213) groups must show a difference in percentages equal to three standard errors of the difference before difference between them can be considered significant, since there is only 1 chance in 1000 that a difference of plus three standard errors of the difference will arise when the true difference is zero.

In the present study differences equal to three standard errors of the difference have not occurred between any of the groups compared. The findings for the total problem and normal groups according to age division are presented in Table 17. The number of standard errors of the difference appear in the table. To find the value of the standard errors of the difference in terms of chance in one hundred that one group is on the average better than another, Table 34 from Garrett (14, p. 213) has been utilized.

a. Total problem and normal groups. The sigma differences (differences in terms of standard errors of the difference) for the seven-year groups range from .13 standard errors of the difference for perception and coördination, to 1.54 for information. There are 56 chances in 100 that the seven-year problem children will do better on tests of imagery; 93 chances that the normal children will do better on information, and they are superior in all other categories, chances in 100 ranging from 55 for perception and coördination to 92 chances on number relations. There are 80 chances in 100 that normal children will exceed the problem children on tests of invention and reasoning. There is, therefore, a tendency for the normal children to exceed the problem children on all categories except imagery, but only on information, invention and reasoning, and number relations are the chances high. These differences are significant to a degree but do not run sufficiently high to warrant prognosticating virtual certainty of superiority in the case of the seven-year normal group.

In the case of the eight-year group, the range in terms of standard error of the differences is wider, i.e., .18 to 2.29; all differences are in favor of the normal group. There are 99 chances in 100 that the normal eight-year-olds will be superior on tests of imagery; 96 chances in 100 that they will be better on tests of information. Other differences in categories run from 57 to 74 chances in 100, that the normals will exceed the problem group. The normal eight-year group shows, therefore, a superiority, but only in case of imagery is this to the extent of 99 chances in 100.

The nine-year problem children are superior on tests of comprehension (64 chances in 100). The normal group is superior in all other categories, but only in tests of imagery and number relations do they have more than 90 chances in 100 of exceeding the problem group.

TABLE 17

DIFFERENCES BETWEEN PROBLEM AND NORMAL GROUPS IN TERMS OF STANDARD ERRORS OF THE DIFFERENCE; CHRONOLOGICAL AGE 7-0 TO 9-11, INCLUSIVE

Categories	7-year-olds			8-year-olds			9-year-olds			Total group		
	D/σ_{D_p}	Chances in 100 in favor of Prob.	Chances in 100 in favor of Nor.	D/σ_{D_p}	Chances in 100 in favor of Prob.	Chances in 100 in favor of Nor.	D/σ_{D_p}	Chances in 100 in favor of Prob.	Chances in 100 in favor of Nor.	D/σ_{D_p}	Chances in 100 in favor of Prob.	Chances in 100 in favor of Nor.
Language	0.18		57	0.42		65	0.20		58	0.41		65
Comprehension	0.42		66	0.18		57	0.36	64		0.08		53
Invention and reasoning	0.86		80	0.66		74	0.47		67	1.47		93
Comparison and judgment	0.68		75	0.59		73	0.57		72	0.65		74
Imagery	0.14	56		2.29		99	1.36		91	2.30		99
Information	1.54		93	1.69		96	0.23		59	1.37		91
Memory	0.58		72	0.63		73	0.73		77	1.00		84
Perception and coördination	0.13		55	0.30		62	0.50		69	0.50		69
Number relations	1.41		92	0.25		60	1.42		92	1.72		96

Their trend to superiority on the categories is therefore positive but not to the point of significance.

b. Problem and normal groups, mental age 7-0 to 9-11, inclusive. The standard errors of the differences between the problem and normal groups on the categories when mental age is held within a constant range are portrayed in Table 18. The groups with mental ages 7-0 to 9-11 do not differ in any of the categories as much as one standard error of the difference. The problem cases are superior in five of the categories and the normals in three; the differences, however, are not great enough to be considered significant.

The groups with mental ages 8-0 to 8-11 show about the same general trends as the 7-0 to 7-11 mental age groups. The normal cases excel in three of the categories. Differences in terms of chances in 100 in favor of either problem or normal cases reaches as much as 96 in only one category, i.e., number relations (in favor of normal group).

The 9-0 to 9-11 mental age groups show small differences on the categories; 7 out of the 9 categories are in favor of the normal group. Grouping the findings of the mental age levels accentuates the trend in favor of the normal groups, although the trend is not strong. The normal cases have 92 chances in 100 of being better in tests of comprehension, and 90 out of 100 for number relations. The problem group has better rating in only one category, i.e., language.

c. Total selected groups. Differences in terms of standard errors of the difference in the categories are presented in Table 19 for the total problem and normal groups, the groups with mental ages 7-0 to 9-11, and the most and least serious problem cases. The trend toward superiority is in favor of the normal groups and the least serious problem cases. The total normal group has 93 chances in 100 of being better in tests of invention and reasoning, 96 chances in 100 of being better in tests of number relations, and in imagery 99 chances. The 7-0 to 9-11 mental age normal group has 92 chances in 100 of being better in comprehension. The problem group excels in only one category, namely, language (58 chances in 100). The most and least serious problem cases differ as much as one standard error in only one category (imagery), all other differences are less.

TABLE 18

Differences between Problem and Normal Groups with Mental Ages 7-0 to 9-11 in Terms of Standard Errors of the Difference

	MA 7-0 to 7-11			*MA* 8-0 to 8-11			*MA* 9-0 to 9-11			*MA* 7-0 to 9-11		
		Chances in 100 in favor of			Chances in 100 in favor of			Chances in 100 in favor of			Chances in 100 in favor of	
Categories	D/σ_{D_p}	Prob.	Nor.	D/σ_{D_p}	Prob.	Nor.	D/σ_{D_p}	Prob.	Nor.	D/σ_{D_p}	Prob.	Nor.
Language	0.14		55	0.19	57		0.46	67		0.20	58	
Comprehension	0.75	77		0.29	62		0.10		54	1.40		92
Invention and reasoning	0.94	83		0.51		69	0.35		64	0.62		73
Comparison and judgment	0.17	57		0.06	52		0.11		54	0.06		52
Imagery	0.00			0.00			0.00			0.00		
Information	0.70		76	0.91		82	0.49		68	1.25		89
Memory	0.05	52		0.69	76		0.40		65	0.69		76
Perception and coördination	0.08	53		0.08	53		0.67		75	0.09		54
Number relations	0.51		69	1.80		96	0.13		55	1.32		90

TABLE 19

DIFFERENCES IN TERMS OF STANDARD ERRORS OF THE DIFFERENCE FOR THE TOTAL PROBLEM AND NORMAL GROUPS, PROBLEM AND NORMAL GROUP WITH *MA* 7-0 TO 9-11, AND THE MOST AND LEAST SERIOUS PROBLEM CASES

	Total problem and normal group			Problem and normal groups *MA* 7-0 to 9-11			Most and least serious problem cases		
		Chances in 100 in favor of			Chances in 100 in favor of			Chances in 100 in favor of	
Categories	D/σ_{D_p}	Prob.	Nor.	D/σ_{D_p}	Prob.	Nor.	D/σ_{D_p}	Most	Least
Language	0.41		65	0.20	58		0.21		58
Comprehension	0.08		53	1.40		92	0.26		60
Invention and reasoning	1.47		93	0.62		73	0.00		
Comparison and judgment	0.65		74	0.06		52	0.10		54
Imagery	2.30		99	0.00			1.00		84
Information	1.37		91	1.25		89	0.27		60
Memory	1.00		84	0.69		76	0.23	59	
Perception and coördination	0.50		69	0.09		54	0.31		62
Number relations	1.72		96	1.32		90	0.85	80	

d. Summary.

1. There is a trend in favor of the normal groups and the least serious problem cases on the nine mental categories.

2. Differences are not sufficiently high to be significant. There are a few exceptions which point to superiority. These are: the normal eight-year-olds and the total normal group have 99 chances in 100 of exceeding the problem groups on tests of imagery. The total normal group and normal group with mental ages 7-0 to 9-11 have 90 chances in 100 of exceeding on tests of number relations. Sigma differences are, on the whole, small, and on none of the categories is there a difference equal to three standard errors of the difference.

3. On the basis of the findings for the sundry categories on all the groups compared, no significant difference has been found in the mental functioning patterns of (*a*) seven-, eight-, and nine-year-old problem and normal children of comparable median mental ages; (*b*) seven-, eight-, and nine-year-old problem and normal children with a mental-age range of 7-0 to 9-11 and comparable median mental ages; and (*c*) most serious and least serious problem cases of comparable median mental age.

5. *Stanford-Binet Subsidiary Tests on Which Groups Compared Show Significant Differences*

The results on the Stanford-Binet subsidiary tests showed that the groups had large differences in percentage of success on a few tests. All those were selected where it appeared on inspection that significant differences might exist. Computations were made of standard errors of the percentages for the tests. The results from these computations showed that there was a limited number of tests where groups show significant differences.

The finding on tests where groups showed standard errors of the difference in the percentages of three or more are presented in Table 20. A difference between groups of three or more standard errors of the difference, according to Garrett (14, p. 213), is "indicative of a significant difference (virtual certainty) since there is only about 1 chance in 1000 that a difference of $+3\sigma$ of the difference will arise when the true difference is zero." An explanation of instances in which one group is certain to excel another on subsidiary tests follow.

TABLE 20

STANFORD-BINET SUBSIDIARY TESTS ON WHICH GROUPS SHOW SIGNIFICANT DIFFERENCES; TOTAL PROBLEM AND NORMAL GROUPS; PROBLEM AND NORMAL GROUPS MENTAL AGE 7-0 TO 9-11; AND MOST AND LEAST SERIOUS PROBLEM CASES

Year	Item	% of success Prob.	% of success Nor.	% Diff.	Stand. Er. Prob.	Stand. Er. Nor.	St. Er. of Diff.	No. St. Er. of Diff.	Difference in favor of
CA 7-0 to 7-11									
VII	Pictures	88.6	71.6	17.2	3.1	3.4	4.7	3.66	Prob. group
VIII	Comprehension	41.2	60.9	19.7	5.0	4.1	6.4	3.08	Normal group
IX	Date	8.3	42.9	34.6	2.8	4.7	5.6	6.18	Normal group
	Change	9.3	30.5	21.2	2.9	4.4	5.3	4.00	Normal group
X	Absurdities	4.1	23.9	19.8	2.0	4.2	4.7	4.21	Normal group
	Reading	2.1	19.0	18.9	1.4	3.8	4.1	4.68	Normal group
CA 8-0 to 8-11									
X	Vocabulary	5.7	23.4	17.7	2.3	4.4	4.9	3.60	Normal group
	Absurdities	25.7	41.5	15.8	1.4	2.6	2.9	5.45	Normal group
	Reading	22.9	44.7	21.8	4.1	5.1	6.6	3.33	Normal group
XII	Sentences	2.9	19.1	16.2	1.6	4.1	4.4	3.71	Normal group
	Digits backwards	9.5	28.7	19.2	2.9	4.7	3.2	5.97	Normal group
CA 9-0 to 9-11									
X	Comprehension	63.4	37.5	25.9	4.8	4.7	6.7	3.85	Prob. group
XII	Abstract words	2.9	14.4	11.5	.7	3.4	3.8	3.00	Normal group
CA 7-0 to 9-11									
VII	Pictures	93.4	85.5	7.9	1.4	2.0	2.5	3.18	Prob. group
VIII	20 to 1	62.7	74.9	12.2	2.8	2.5	3.7	3.27	Normal group
IX	Date	44.9	65.0	20.1	2.9	2.7	3.9	5.08	Normal group
	Change	44.6	56.8	12.2	2.9	2.8	4.1	3.00	Normal group
	Digits backwards	39.3	55.8	16.5	2.8	2.9	4.0	4.13	Normal group
X	Absurdities	29.7	42.9	13.2	2.6	2.8	3.9	3.41	Normal group
	Reading	20.5	35.3	14.8	2.3	2.7	3.6	4.13	Normal group
XII	Sentences	4.3	15.3	11.0	1.2	2.1	2.4	4.64	Normal group
	Abstract words	3.5	9.6	6.3	1.0	1.7	1.9	3.18	Normal group

TABLE 20 (Continued)

Year Item	% of success		%	Stand. Er.		St. Er.	No. St. Er.	Difference
	Prob.	Nor.	Diff.	Prob.	Nor.	of Diff.	of Diff.	in favor of
MA 7-0 to 7-11								
IX Date	12.2	34.0	23.8	3.7	6.3	7.4	3.22	Normal group
MA 8-0 to 8-11								
VIII 20 to 1	72.1	90.6	18.5	5.0	3.3	6.1	3.03	Normal group
IX Date	50.6	75.0	25.6	5.6	5.0	7.4	3.45	Normal group
Digits backwards	35.4	60.5	35.1	5.3	5.5	7.7	4.56	Normal group
MA 9-0 to 9-11								
IX Date	73.3	93.3	20.0	5.4	3.2	6.4	3.12	Normal group
MA 7-0 to 9-11								
VIII 20 to 1	68.0	81.7	13.7	3.1	2.8	4.2	3.26	Normal group
IX Date	45.6	69.9	24.3	3.3	3.1	4.6	5.28	Normal group
Digits backwards	39.2	57.0	17.8	3.3	3.6	4.9	3.73	Normal group
Most and least serious problem cases								
CA 7-0 to 9-11								
XII Picture interpretation	2.7	16.0	13.3	1.7	4.3	4.5	3.00	Least serious group

a. Total problem and normal groups. The problem and normal groups with chronological ages 7-0 to 7-11 showed significant differences on six subsidiary tests. The problem group was significantly superior on the picture description test at the VII-year level of the Stanford-Binet. The normal group was superior on the comprehension questions at the VIII-year level, the date and change problems at the IX-year level, and the absurdities and reading test at the X-year level.

These differences do not cover a sufficient number of tests to delineate a mental functioning pattern for either group, but indicate that problem children, by and large, will do better in describing the Stanford-Binet pictures, while normal children will excel on the tests of comprehension and the detection of absurdities, the change, reading tests, and the date questions.

The 8-0 to 8-11 chronological age groups show differences on five tests; all in favor of the normal group. The tests are vocabulary, absurdities and reading at the X-year level, and dissected sentences, and digits backwards at the XII-year level. This indicates that eight-year normal children will, on the whole, have a better vocabulary, more facility in detecting absurd statements, better reading ability, and a longer memory span for digits backwards than eight-year problem children.

The 9-0 to 9-11 chronological age groups show significant differences in only two tests. The problem group excels on the X-year comprehension questions, and the normal group on the dissected sentences at the XII-year level. These differences are too limited in number to have diagnostic import.

When the total findings for seven-, eight-, and nine-year-old problem and normal groups are examined, significant differences are shown on nine tests. The problem group excels only on the picture description test at the VII-year level. The normal group is superior on the following tests: counting 20 to 1 at the VIII-year level, date, change, and repeating digits backwards at IX-year level, absurdities and reading at the X-year level, and dissected sentences and abstract words at the XII-year level.

There is a suggestion of patterning when the findings for the three age divisions are grouped. If these are weighed against the mental categories selected as representative of Stanford-Binet mental functioning as a whole, however, there is not enough consistency to warrant definite conclusions on differences in mental functioning patterns for problem and normal children drawn from these age groups. The findings do indicate that the differences between problem and normal children found on these test items are significant and it is virtually certain that problem children of similar ages and intelligence will excel normal children on the picture description at the VII-year Stanford-Binet level; normal children will excel problem children of similar age and ability on the counting 20 to 1 test at the VIII-year level, the date, change and digits backwards at the IX-year level, reading and absurdities at the X-year and abstract words and dissected sentences at the XII-year level.

b. Problem and normal groups with mental ages 7-0 to 9-11, inclusive. The problem and normal groups show fewer differences on subsidiary tests when the mental age and the chronological age ranges are the same, 7-0 to 9-11, indicating that the nearer problem and normal children are matched in age and intelligence the more apt are they to be alike in their success on subsidiary tests of the Stanford-Binet, and the less apt are they to show significant differences on the subsidiary tests.

The mental age group 7-0 to 7-11 show significant differences in only one test, the date test at the IX-year level; this is in favor of the normal group. The 8-0 to 8-11 mental-age groups are significantly different on the VIII-year test, counting 20 to 1, and on the date, and digits backwards tests at the IX-year level, all differences are in favor of the normal group. The mental age groups 9-0 to 9-11 show significant differences in only one test, i.e., giving the date at the IX-year level; this difference is in favor of the normal group.

When the mental age range is increased 7-0 to 9-11, the normal group is significantly superior on the tests, counting backwards from 20 to 1 at the VIII-year level, and the date and digits backwards at the IX-year level.

c. Most and least serious problem cases. The most and least serious problem cases differ significantly in only one test. The least serious cases excel in the picture interpretation test of the VII-year level.

d. Summary.

1. Significant differences are present in the performance of problem and normal children on a limited number of the Stanford-Binet subsidiary tests.

2. Problem children excel comparable groups of normal children on subsidiary tests as follows:

(*a*) Chronological age 7-0 to 7-11, picture description, VII-year level.

(*b*) Chronological age 9-0 to 9-11, comprehension, X-year level.

(*c*) Chronological age 7-0 to 9-11, picture description, VII-year level.

3. Normal children excel comparable groups of problem children on subsidiary tests as follows:

(*a*) Chronological age 7-0 to 7-11.
  Comprehension, VIII-year level.
  Date and change, IX-year level.
  Absurdities and reading, X-year level.
(*b*) Chronological age 8-0 to 8-11.
  Vocabulary, absurdities, reading, X-year level.
  Dissected sentences, digits backwards, XII-year level.
(*c*) Chronological age 9-0 to 9-11.
  Abstract words, XII-year level.
(*d*) Chronological age 7-0 to 9-11.
  Counting 20 to 1, VIII-year level.
  Date, change, digits backwards, IX-year level.
  Absurdities, reading, X-year level.
  Dissected sentences, abstract words, XII-year level.
(*e*) Mental age 7-0 to 7-11.
  Date, IX-year level.
(*f*) Mental age 8-0 to 8-11.
  Counting 20 to 1, VIII-year level.
  Date, digits backwards, IX-year level.
(*g*) Mental age 9-0 to 9-11.
  Date, IX-year level.
(*h*) Mental age 7-0 to 9-11.
  Counting 20 to 1, VIII-year level.
  Date and digits backwards, IX-year level.

4. Comparable groups of least serious problem children excel most serious problem children on the picture interpretation test at the VII-year level.

5. Significant differences found on test items are not sufficiently extensive to differentiate the mental functioning patterns of comparable groups of seven-, eight-, and nine-year problem and normal children.

6. Differences of percentages on subsidiary tests, between groups do not run high, the largest difference found is 34 per cent, but differences of more than 15 per cent are rare.

7. Groups tend to run much the same in patterning on the subsidiary tests.

Summary and conclusions in respect to the findings for the study will be presented in Chapter V.

V. SUMMARY AND CONCLUSIONS

The study represents an attempt to discover whether problem and non-problem children of seven, eight, and nine years of age show significant differences in their mental functioning patterns on the 1916 Stanford-Binet examination when the subsidiary tests were grouped into categories according to the mental function that is predominantly active in bringing about successful performance in each. The grouping of the subsidiary tests yielded the following categories: language, comprehension, invention and reasoning, comparison and judgment, imagery, information (general and personal), memory, perception and coördination, and number relations.

There were 303 problem children and a like number of non-problem children of seven, eight, and nine years of age used in the study. The problem group had 97 children in the seven-year age range, 105 in the eight-year range, and 101 in the nine-year. In the normal group there were 105 in the seven-year age range, 94 in the eight-year, and 104 in the nine-year range. The groups were matched for median chronological age, mental age, and intelligence quotients.

The problem group was composed of children who had been admitted to the Bellevue Mental Hygiene Clinic and were examined by members of the psychiatric and psychological staffs during the period of their treatment. The non-problem group was composed of children who were non-clinical cases and had been examined by graduate students in psychology at New York University. All children of both groups were examined with the 1916 Stanford-Binet Intelligence Test. The children live in the metropolitan area of New York City and in most instances are in attendance at school. The children composing the non-problem group were chosen because they were non-clinical cases and represent average children from an adjustment standpoint. The criterion for the selection of the problem cases was the fact of their being under treatment for behavior difficulties at the time of their examination.

The behavior characteristics of the problem children were obtained from clinic records. The case history of each child was carefully investigated and all behavior manifestations tabulated according to the clinician's list from Wickman (67), with the following items added: running away from home, playing with fire, school problems, speech defects, and physical defects and disease. In addition, the official psychiatric diagnosis was obtained for each problem child.

The problem and non-problem groups were matched in respect to median chronological age and mental age. Each age division, namely, the seven-year, eight-year and nine-year, were also comparable in median chronological and mental age.

The records of the 606 children were classified for purposes of study and comparison. The following groupings were made:

1. Total problem and normal groups composed of 303 children each.

2. The problem and normal children were grouped according to chronological age division. This yielded two groups of seven-, eight-, and nine-year-old children, one made up of problem children and the other non-problem children for each age division. There were 97 problem children whose chronological ages ranged from 7-0 to 7-11, and 105 non-problem children; 105 problem children and 94 non-problem cases with an age range of 8-0 to 8-11, and 101 problem children and 104 non-problem children with an age range of 9-0 to 9-11.

3. All the problem and normal cases with mental ages between 7-0 and 9-11 were selected for study. There were 219 problem children and 186 non-problem children in the total groups who had this mental age range.

4. When the problem and normal cases with mental ages ranging from 7-0 to 9-11 were separated according to mental ages, the following were obtained: 74 problem and 50 non-problem children had mental ages between 7-0 to 7-11; 79 problem and 76 non-problem children had mental ages 8-0 to 8-11; and 66 problem and 60 non-problem cases had mental ages 9-0 to 9-11.

5. The problem cases were separated according to seriousness of behavior; the 25 from each year level who had the largest number of behavior manifestations considered to be most serious by clinicians in Wickman's (67) behavior list, were selected, and the 25 cases from each age division who had the fewest number of least serious behavior manifestations according to the same list. This yielded groups of 75 each of most and least serious problem cases.

All the problem and normal children separated according to age division, mental age groupings, and degree of seriousness of behavior manifestations proved to be comparable in respect to median chronological age, mental age, and intelligence quotients.

Data as to sex were obtained on problem and normal cases, and color in the case of the problem group. No effort was made to control either sex or color or physical condition in the groups studied. The groups were equated in respect to age and median intelligence.

The objectives of the investigation were:

1. To determine whether problem and non-problem children of seven, eight, and nine years of age equated on basis of median mental ability, show significant differences in mental functioning patterns as determined by examination with the 1916 Stanford-Binet Intelligence Test when groupings of the subsidiary tests are made according to the mental function each purports to measure.
2. To determine if the control of mental age within limits of the chronological age (7-0 to 9-11 inclusive) would reveal significant differences in mental functioning patterns of the problem and non-problem children.
3. To determine, in the case of problem children, whether degree of seriousness and number of behavior manifestations were associated with differences in mental functioning; whether children who show the most serious behavior manifestations and children who show behavior manifestations of minor importance were significantly different in mental functioning patterns.
4. To give, in case of the problem groups, an adequate picture of the group in terms of behavior manifestations.
5. To interpret the findings in light of their significance in the clinical differentiation of problem children of these ages.

All data except that on age, intelligence, color, and sex have been expressed in percentage form. Statistical techniques have been used to determine reliability of group findings on the mental categories, and to determine reliability of the differences between groups on the mental categories. The problem and non-problem groups were matched in respect to chronological ages, median mental ages, and median intelligence quotients. Each age and mental age division had comparable median mental ages, and likewise the most and least serious problem cases. The mental make-up of the groups subjected to comparative treatment was, from a quantitative standpoint, therefore, sufficiently alike to bring out qualitative differences, if any existed. If inferiority of certain intellectual functions, and irregularities in these, were a correlate of maladjustment in the behavioral sphere in the case of the problem child, the problem and non-problem groups were ideally matched to bring out or refute this assumption.

While no attempt was made to control the proportion of boys to girls or white to negro children in the study, the normal group had slightly over 5 per cent more boys than girls and the problem group had 42 per cent more boys. Data as to color of the problem children showed that the negro boys outnumbered the negro girls about three to one. The per cent of negro children in the total group was 32.4 and that of the white children 67.6 per cent. This is a disproportionate number of negro children when compared to the racial population of New York City.

A. Behavior Manifestations and Psychiatric Diagnoses

All behavior manifestations and associated conditions, namely, physical defects and disease, learning problems and speech defects, were obtained from the case history of each problem child. The per cent of occurrence of each item varied. Restlessness was present in 72 per cent of the group and writing obscene notes in less than 1 per cent.

Where there was a tendency for a behavior manifestation or an associated condition to occur in one age division to a slight or high degree, it was present in a somewhat similar fashion in other age divisions. In the total problem group the highest differences between any one age division in the items was 12 per cent. There was a tendency for certain behavior manifestations to decrease with age, pointing to the operation of adjustment factors associated with maturation.

The items most frequently noted, in order of per cent of occurrence (72 per cent to 20 per cent), were: restlessness, nervousness, quarrelsomeness, disobedience, inattention, physical defects or disease, lack of interest in work, learning problems, shyness, enuresis, overbearing behavior, temper tantrums, and stealing. Extremely grave problems such as domineering, overbearing behavior and stealing occurred in 20 per cent of the problem cases; the highest occurrence of these manifestations was present among the seven-year problem group.

The high incidence of physical defects or disease and learning problems (36 and 28 per cent) is a significant finding of the study, and warrants the conclusion that problem children of these ages are not handicapped in respect to problems of adjustment alone, but also in physical health and in their capacity to make progress in school. It is manifest that the problem group with 28 per cent showing learning problems exceeds the normal child population in this respect.

When mental age was limited to that of the chronological age, namely, 7-0 to 9-11, the findings in regard to frequency of the items were substantially the same as those for the total problem group.

By the separation of the age divisions according to the presence of most and least serious problem (25 of each, from each age division) a marked difference was revealed between these groups. The most serious cases showed 25 items with a per cent of 20 to 80 and the least serious cases had 7 items with a frequency of 28 to 61. The least serious group as a whole exceeded the most serious only in the incidence of learning problems but the difference is too small to be significant.

The number of problems presented by the most serious cases are not only more numerous but they are more grave in their implication in respect to the future adjustment of these children. Deep personality difficulties such as resentfulness, cruelty and bullying, stubbornness, unreliability and untruthfulness, and problems of control such as restlessness, nervousness, and inattention typify the most serious problem cases.

The total problem group is characterized by problems that range in degree of seriousness from minor maladjustment to extremely grave problems, with the average child in the group showing moderately serious behavior difficulties.

The psychiatric diagnoses of the problem group included such conditions as behavior problems and disorders, neurotic and psychopathic traits and disorders, specified personality problems, school problems, problems of home care and commitment, classification of intelligence, speech defects, and physical defects and disease.

The age groups resembled each other closely; there were a large number of cases with behavior problems and one-half of the group showed psychopathic or neurotic traits.

The group whose mental age range was 7-0 to 9-11 did not show any trend in respect to psychiatric diagnoses appreciably different from those obtained for the total problem group.

The most serious problem cases had a markedly higher percentage of the more specific psychiatric problems of behavior, neurotic and personality disorders, than the total problem group. Problems of placement, speech defects, and physical defect and disease, and problems of home care are infrequently mentioned in the psychiatric diagnoses of these children. Reading disabilities, problems of placement, and physically handicapping conditions occur most frequently as the diagnoses in the least serious problem cases.

B. Mental Functioning Patterns

The mental functioning patterns of the problem and non-problem groups as derived after grouping the 1916 Stanford-Binet subsidiary tests into categories were not significantly different. There were no significant differences between problem and non-problem groups in the case of any of the nine categories.

When mental age was not controlled within the limits 7-0 to 9-11, there was a definite tendency for the normal groups to rank higher than the problem groups (in terms of standard errors of the differences between percentages of success) in the categories. The problem groups with mental age range 7-0 to 7-11, and 8-0 to 8-11 ranked higher in the categories, while the normal groups with a mental age range of 9-0 to 9-11 and the total normal group with a mental age range 7-0 to 9-11 were higher in the categories.

The age factor, therefore, tended to tip the balance on the categories in favor of the younger problem child. In case of the most and least serious problem cases the trend on the categories is in favor of the least serious problem cases.

Interpreted in terms of chances in 100 that one group will exceed another in the categories, the chances for all groups compared ranged from 51 to 99, with a median centering around 70 chances in 100 of one group exceeding the other, and a mode of 55.

The percentage of success in the individual categories for any group was widely different; there were consistently low percentages of success in tests of imagery and high percentages of success in information tests.

The reliability of the percentages of success on the categories for groups compared was about the same. Standard errors of percentages ranged in size from less than 1 per cent to 7 per cent, being on the average between 4 and 5 per cent.

The standard errors of the difference in percentages of success on the categories for the groups compared ranged from less than 1 to nearly 9 per cent. This indicates that the problem and normal groups can still vary considerably on the categories before critical differentiation will appear. In terms of number of standard errors of the difference, the differences in percentage on the categories were seldom as much as one standard error. From a statistical standpoint the difference in mental functioning between problem and normal children of seven, eight, and nine years of age is therefore not great enough to be significant.

Problem children, by and large, have about the same facility as non-problem children of the same age (seven, eight, or nine) and intelligence on mental categories as derived from grouping of the subsidiary 1916 Stanford-Binet, and their mental functioning is not significantly different. Therefore, the critical difference between problem children and non-problem children does not lie in the nature, quality, or level of their intelligence. Qualitative differences in intelligence are not present in sufficient degree to permit clinical differentiation of a problem child of seven, eight, and nine years of age from a non-problem child of like age when both are given the 1916 Stanford-Binet Intelligence Test.

Neither the degree of seriousness of behavior manifestations, nor the gravity of psychiatric conditions present in problem children can be used as an index to set them apart from normal children in the quality of their mental functioning on categories derived from grouping the subsidiary tests of the 1916 Stanford-Binet Intelligence Test. Increase in percentage of success on the categories is associated with an increase in age and mental age, indicating that success on the categories is a function of mental level and is conditioned by maturation factors more than presence or absence of problem behavior in children of this age and intelligence level.

The findings of the study indicate that the mental functioning of problem and non-problem children is very much the same, and results from the Stanford-Binet Intelligence Test are valuable mainly as indicators of intellectual level; the *IQ* thus retains its usefulness.

In addition to the mental functioning picture of problem and non-problem children which has been presented in the preceding pages, there are findings of the study which appear to have significance in the field of psychology and education. These are as follows:

1. The Stanford-Binet Intelligence Test is not a suitable instrument for the qualitative differentiation of children except in so far as it is a means of measuring general intelligence.

2. That maladjustment does not appear to condition intelligence in any definite way in children of these age groups, is an important fact that has been gleaned from the present study.

3. From the standpoint of education the study contains a variety of material on the behavior of children seven, eight, and nine years of age. Though the maladjustment of the problem group in this study appears to be extreme in many of the children, it is a hopeful sign that this has had no deteriorating effect on the qualitative aspects of intelligence.

4. From a social point of view the problem child is seriously handicapped by problem reactions, although he may have average intelligence. It seems the responsibility of educators and others in related fields to work more adequately for the adjustment of fundamental behavior difficulties in children, especially at these early ages.

C. IMPLICATIONS OF THE STUDY

The study may be said to have three main implications; these are:

1. The intelligence of a child is like his physical growth. It is unsusceptible to the vicissitudes of ordinary psychological content and adjustment mechanisms.

2. The social education of a child appears to be conditioned more surely by other factors than intelligence. These factors are an interrelated complex of social, physical, and adjustment mechanisms both as regards the person of the child and the environment in which he lives.

3. Problem behavior in a child has many correlates. These are difficult to isolate and to simplify, but may be present in constellations which lead to specific reaction tendencies.

Further suggestions for research seems to lie in the following directions:

1. A study of groups of older problem and non-problem children might be undertaken along the same lines as the present study, in order to determine whether maturation at the upper age levels, namely, years ten, eleven, and twelve, was associated with the same phenomena of mental functioning as was found to be present in children of seven, eight, and nine years of age.

2. Comparative studies of behavior manifestations in problem and non-problem children seem indicated.

3. The extraordinary nervousness and restlessness of problem children warrant careful investigations.

4. The relation of school and learning problems to problem behavior seem to need investigation in those phases of child life that are closely tied up with his social and physical development.

5. Studies which aim to discover whether problem and non-problem children differ in native and emotional reactions deserve a place of importance equal to those studies which aim to discover intellectual differences. Such research may bring to light unknown variables which are correlated with the dynamics of the inner organization and maturation processes in young children.

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